

PROSONIC

CTV-21T1

MODEL

SERVICE MANUAL

SERVICE MANUAL

**MODEL: SM-1 CHASSIS
(MONO)**

COLOUR TELEVISION RECEIVER

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RECOMMENDATION FOR SERVICE REPAIRS

- 1- Use only original spare parts. Only use components with the same specifications for replacement.
- 2- Original fuse value only should be used.
- 3- Main leads and connecting leads should be checked for external damage before connection.
Check the insulation.
- 4- Parts contributing to the safety of the product must not be damaged or obviously unsuitable.
This is valid especially for insulators and insulating parts.
- 5- Thermally loaded solder pads are to be sucked off and re-soldered.
- 6- Ensure that the ventilation slots are not obstructed.
- 7- Potentials as high as 25 KV are present when this receiver is operating. Operation of the receiver outside the cabinet or with back cover removed involve a shock hazard from the receiver.
Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken.
Glass fragments will be violently expelled.
Always discharge the picture tube anode to the receiver chassis to keep of the shock hazard before removing the anode cap.
- 8- Keep wire away from the high voltage or high temperature components.
- 9- When replacing a wattage resistor in circuit board, keep the resistor 10 mm away from circuit board.

HANDLING OF MOS CHIP COMPONENTS

Mos circuit requires special attention with regard to static charges. Static charges may occur with any highly insulating plastics and can be transferred to persons wearing clothes and shoes made of synthetic materials. Protective circuits on the inputs and outputs of mos circuits give protection to a limited extent only due to time of reaction.

Please observe the following instructions to protect the components against damage from static charges.

- 1- Keep mos components in conductive package until they are used. Most components must never be stored in styropor materials or plastic magazines.
- 2- Persons have to rid themselves of electrostatic charges by touching mos components.
- 3- Hold the component by the body touching the terminals.
- 4- Use only grounded instruments for testing and processing purposes.
- 5- Remove or connect mos ics when operating voltage is disconnected.

X-RAY RADIATION PRECAUTION

- 1- Excessive high voltage can be produce potentially hazardous X-RAY radiation. To avoid such hazard, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 25KV at zero beam current (minimum brightness) under 220V AC power source. The high voltage must not under any circumstance, exceed 30KV. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
- 2- The primary source of X-RAY radiation in this TV receiver is the picture tube. For continued X-RAY radiation protection, the replacement tube must be exactly the same type tube as specified in the part list.

SPECIFICATION

POWER SUPPLIES

Nominal: 220V AC 50 Hz. The chassis is fully mains isolated and is stabilized across mains voltage range from 165V to 265V for less than 0.75 % change in picture size. No mains input adjustment is required.

POWER CONSUMPTION

Typically: 75 W. Maximum: 95 W (for 20" and 21" models)

FREQUENCY COVERAGE

Hyperband (VHF CH 2 to UHF CH 69 including CATV): 47-862 MHz

UHF (CH 21-69): 471-862 MHz

IF FREQUENCIES (in MHz)

	VISION	SOUND
B/G (EUROPE)	: 38.9	33.4
(UK)	: 39.5	33.5
L' (FRANCE)	: 32.7	39.2
L (FRANCE)	: 39.2	32.7
D/K (USSR)	: 38.0	31.5

FOCUS ADJUSTMENT

Adjust the thickness of lines until being minimum, by focus trimpot on the eht transformer. By using cross hatch of multi-burst test pattern.

WHITE BALANCE ADJUSTMENT

- 1- Apply Philips pattern.
- 2- Adjust VR53, VR55, are trimpots to middle position and VR51, VR52 and VR54 are trimpots to minimum.
- 3- Adjust brt, cont, col to min.
- 4- Adjust at lower grey bar of Philips pattern by screen trimpot that two bars should be seen.
- 5- Increase brt control little and adjust white balance by using VR51, VR52, VR54 with eyes.
- 6- Apply white pattern. Settle screen probe of Minolta. Adjust Y=5nits with brightness.
- 7- Increase contrast adjust $X=Y=270 \div 276$ nits by means of VR53, VR55.
- 8- Set contrast to minimum. Adjust $X=Y=270 \div 276$ nits at Y=5 nits by means of VR51, VR52, VR54.
- 9- Check white balance at high and low contrast level. Again make adjustment if it's necessary.

AFT ADJUSTMENT

- 1- Disconnect the if output of tuner from if input.
 - 2- Apply 38.9 MHz signal with signal generator to if input.
 - 3- Connect a digital voltmeter to aft pin of IC476.
 - 4- Adjust T181 coil until the voltage of IC476 is being 2.5Vdc
 - 5- Connect the if input which input is disconnected in the beginning.
- NOTE: Aft adjustment will be done at 39.5 MHz on pal I chassis.*

FTZT ADJUSTMENT

- 1- Disconnect the if output of tuner from if input.
- 2- Apply 30.9 MHz signal with a signal generator.
- 3- Connect oscilloscope probe L151 by Q151 adjust signal at oscilloscope by T27 coil that the signal should be minimum level.
- 4- Apply 40.4 MHz signal with a signal generator.
- 5- Connect oscilloscope probe L151 by Q151 adjust signal at oscilloscope by T26 coil that the signal should be minimum level.
- 6- Connect the if input which is disconnected in the beginning.

SERVICING ADJUSTMENTS AND ALIGNMENTS

HIGH VOLTAGE TEST

There is no high voltage adjustment component on the chassis. Changing of +120 depends on the supply voltage. If high voltage is to be measured.

- 1- Connect the + probe of high voltage tester to the anode of crt.
- 2- Adjust contrast and brightness to minimum.
- 3- Measure the high voltage as $23.0 \pm 5\% \text{KVdc}$ for 14". That voltage is $25.5 \pm 5\% \text{KVdc}$ KV for 20" (51 cm) screen size.
- 4- For maximum brightness, high voltage regulation should be 2KVdc max.

AGC ADJUSTMENT

- 1- Apply Philips pattern signal which is 60 dB μV amplitude (1V) to the rf input.
- 2- Adjust VR182 until find a picture without snowy.

VERTICAL ADJUSTMENT

- 1- Apply Philips pattern.
- 2- Cut down vertical amplitude with VR576.
- 3- Center picture with three position key.
- 4- Make vertical adjustment with VR576 that will see lower and top lines of picture.

HORIZONTAL ADJUSTMENT

- 1- Apply Philips pattern signal.
- 2- Center the picture while shifting to right and left with VR181.

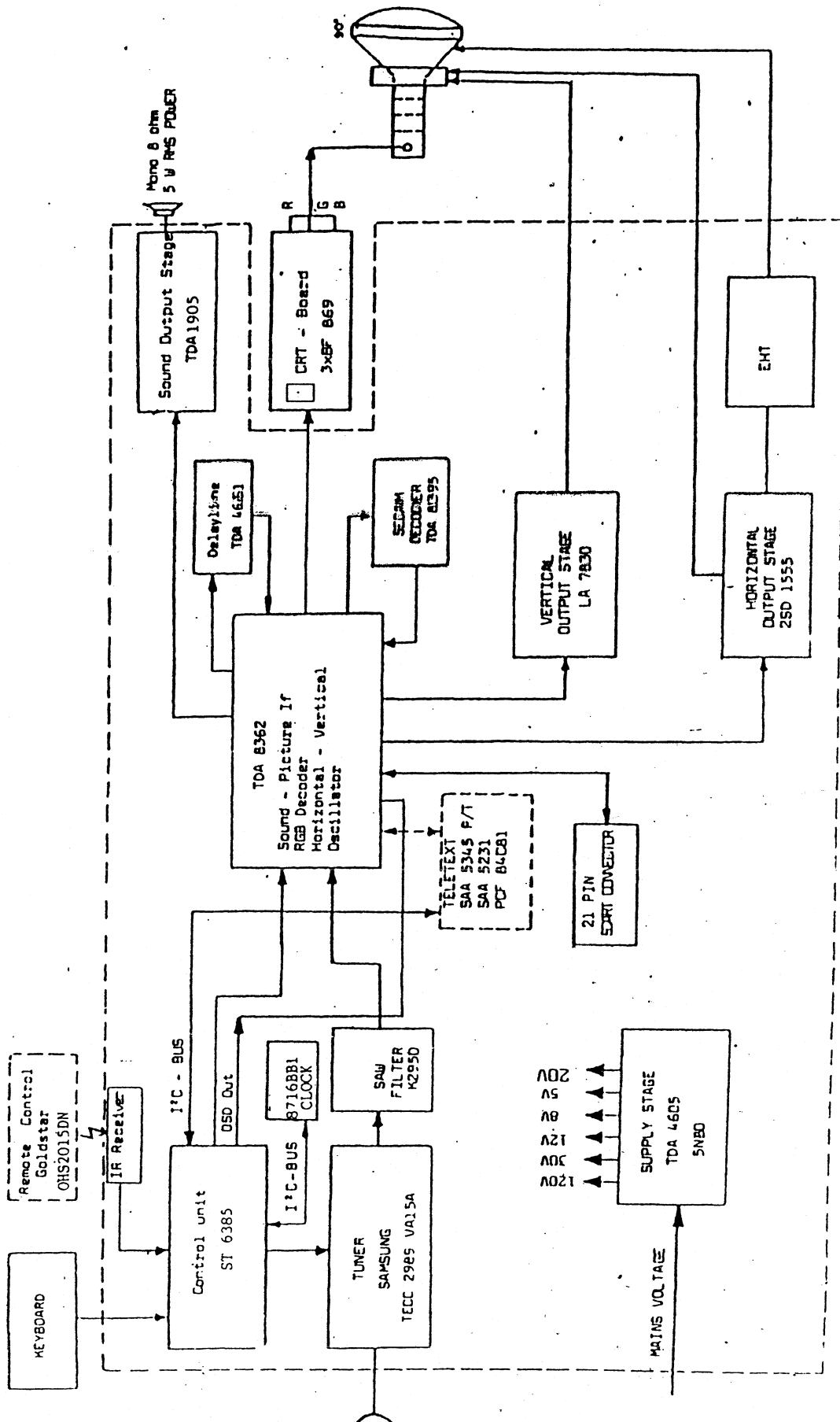
TELETEXT ADJUSTMENT

- 1- Apply one channel signal with teletext publication.
- 2- Cut video signal which goes to IC730.
- 3- Stop horizontal shifting of picture with VC 726.
- 4- Again connect video signal to IC730 and check picture.

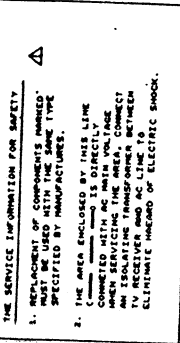
ADJUSTMENT OF SUPPLY VOLTAGE

- 1- Apply Philips pattern signal.
- 2- Make the volume, brightness and contrast adjustment to minimum.
- 3- Adjust the supply voltage on the pin cathode of D112 as $V_{\text{sys}} = 120 \pm 0.5$ by using VR101.

SM1 MONO CHASSIS WITH TELETEX



**SWITCH MODE
POWER SUPPLY
SECTION**



SWITCHED MODE POWER SUPPLY STAGE

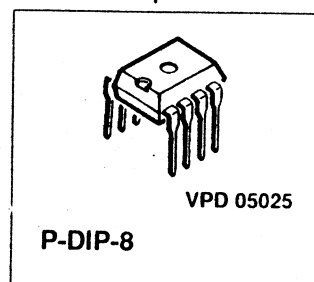
(IC101) TDA4605 and 5N90 mos transistor are used in SMPS circuit. The circuit operates between 165 and 265 V AC (50 Hz) C101, EM106, C102 filter circuit prevents the network noises and the effects of high frequency which is produced in TV set. After rectifying DC voltage is filtered by using C105. The start-up voltage of TDA4605 is obtained from R103 at the same a square wave is produced from pin 5 of IC (TDA4605). This square wave reaches Q101 passing through R111. After that Q101 from and induction on EM111, which produces a voltage on pin 6. This voltage rectified by D101 is used as supply voltage of IC101. IC101 does not operate SMPS by stopping pulses at pin 5 when the network is higher or lower than fixed limits. Pin 2 is control input of overload. If secondary is overload. SMPS is not operated by pin 2.

TDA 4605

Control IC for Switched-Mode Power Supplies using MOS Transistors (IC 101)

FEATURES

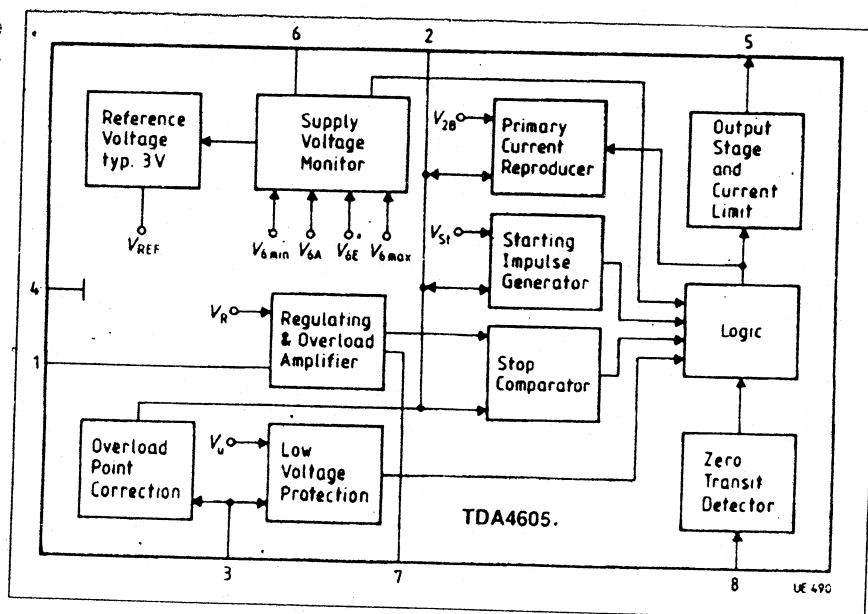
- Fold-back characteristic provides overload protection for external components
- Burst operation under short-circuit conditions
- Loop error protection
- Switch-off if line voltage is too low (undervoltage switch-off)
- Line voltage compensation of overload point
- Soft start for quiet start-up
- Chip over-temperature protection (thermal shutdown)
- On-chip parasitic transformer oscillation suppression circuitry



The IC TDA 4605 controls the MOS-power transistor and performs all necessary regulation and monitoring functions in free running flyback converters. Since good load regulation over a wide load range is attained, this IC is applicable for consumer and industrial power supplies.

The serial circuit of power transistor and primary winding of the flyback transformer is connected to the input voltage. During the switch-on period of the transistor, energy is stored in the transformer and during the switch-off period it is fed to the load via the secondary winding. By varying switch-on time of the power transistor, the IC controls each portion of energy transferred to the secondary side such that the output voltage remains nearly independent of load variations.

The required control information is taken from the input voltage during the switch-on period and from a regulation winding during the switch off period.



Pin Definitions and Functions

Pin No.	Function
---------	----------

- | | |
|---|--|
| 1 | Regulating Voltage: Information input concerning secondary voltage. By comparing the regulating voltage - obtained from the regulating winding at the transformer - with the internal reference voltage, the output impulse width on pin 5 is adapted to the load at the secondary side (normal, overload, short circuit, no load). |
| 2 | Primary Current Simulation: Information input regarding the primary current. The primary current rise in the primary winding is simulated at pin 2 as a voltage rise by means of an external RC-element. When a value is reached that is derived from the regulating voltage at pin 1, the output impulse at pin 5 is terminated. The RC-element serves to set the maximum power at the overload point set. |
| 3 | Primary Voltage Detector: Input for primary voltage monitor. When the line voltage is too low, the IC is switched off by comparing V_3 with an internal reference. Voltage at pin 3 is used for overload point compensation. Overload point compensation will work 7 times the under voltage limit set. |
| 4 | Ground |
| 5 | Output: Push-pull-output provides ± 1 A for rapid charge and discharge of the gate capacitance at the power MOS transistor. |
| 6 | Supply Voltage: Supply voltage input. From it a stable internal reference voltage V_{REF} and the switching thresholds V_{6A} , V_{6E} , $V_{6\max}$ and $V_{6\min}$ for the supply voltage detector is formed. If $V_6 > V_{6E}$ then V_{REF} is switched on and switched off when $V_6 < V_{6A}$. In addition the logic is only enable for $V_{6\min} > V_6$. |
| 7 | Soft-Start: Input for soft start. Start up will begin with short pulses by connecting a capacitor from pin 7 to ground. |
| 8 | Zero Detector: Input for the oscillation feedback. After starting oscillation, every zero transit of the feedback voltage (falling edge) triggers an output impulse at pin 5. The trigger threshold is at 50 mV typical. |
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STH5N90 **STH5N90FI**

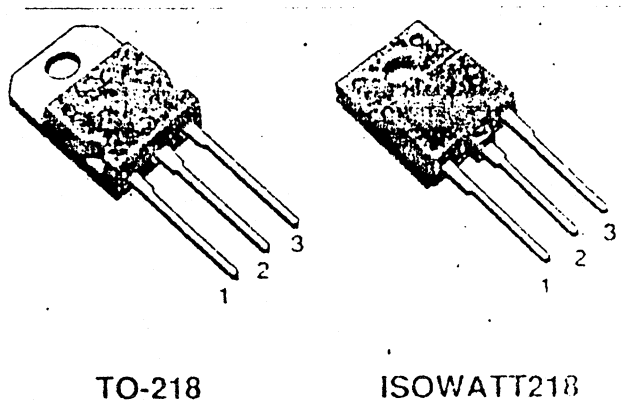
N-CHANNEL ENHANCEMENT MODE **POWER MOS TRANSISTOR (Q101)**

TYPE	V _{DSS}	R _{DS(on)}	I _D
STH5N90	900 V	< 2.4 Ω	5.3 A
STH5N90FI	900 V	< 2.4 Ω	3.5 A

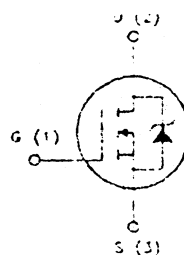
- Typical R_{DS(on)} = 1.9 Ω
- Avalanche Rugged technology
- 100% avalanche tested
- Repetitive avalanche data at 100°C
- Low input capacitance
- Low gate charge
- Application oriented characterization

APPLICATIONS

- High current, high speed switching
- Switch mode power supplies (SMPS)
- Consumer and industrial lighting
- DC-AC inverters for welding equipment and uninterruptible power supply (UPS)



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value		Unit
		STH5N90	STH5N90FI	
V _{DS}	Drain-source Voltage (V _{GS} = 0)	900		V
V _{DGR}	Drain-gate Voltage (R _{GS} = 20 kΩ)	900		V
V _{GS}	Gate-source Voltage	± 20		V
I _D	Drain Current (continuous) at T _C = 25 °C	5.3	3.5	A
I _D	Drain Current (continuous) at T _C = 100 °C	3.3	2.2	A
I _{DM} (*)	Drain Current (pulsed)	20	20	A
P _{tot}	Total Dissipation at T _C = 25 °C	150	60	W
	Derating Factor	1.2	0.48	W/°C
V _{ISO}	Insulation Withstand Voltage (DC)		4000	V
T _{stg}	Storage Temperature	-65 to 150		°C
T _J	Max. Operating Junction Temperature	150		°C

(*) Pulse width limited by safe operating area

			TO-218	ISOWATT218	
$R_{thj-case}$	Thermal Resistance Junction-case	Max	0.83	2.08	°C/W
$R_{thj-amb}$	Thermal Resistance Junction-ambient	Max	30		°C/W
$R_{thc-sink}$	Thermal Resistance Case-sink	Typ	0.1		°C/W
T_l	Maximum Lead Temperature For Soldering Purpose		300		°C

AVALANCHE CHARACTERISTICS

Symbol	Parameter	Max Value	Unit
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T_j max, $\delta < 1\%$)	5.3	A
E_{AS}	Single Pulse Avalanche Energy (starting $T_j = 25\text{ }^\circ\text{C}$, $I_D = I_{AR}$, $V_{DD} = 50\text{ V}$)	300	mJ
E_{AR}	Repetitive Avalanche Energy (pulse width limited by T_j max, $\delta < 1\%$)	14	mJ
I_{AR}	Avalanche Current, Repetitive or Not-Repetitive ($T_c = 100\text{ }^\circ\text{C}$, pulse width limited by T_j max, $\delta < 1\%$)	3.1	A

ELECTRICAL CHARACTERISTICS ($T_{case} = 25\text{ }^\circ\text{C}$ unless otherwise specified)

OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$ $V_{GS} = 0$	900			
I_{DSS}	Zero Gate Voltage Drain Current ($V_{GS} = 0$)	$V_{DS} = \text{Max Rating}$ $V_{DS} = \text{Max Rating} \times 0.8$ $T_c = 125\text{ }^\circ\text{C}$			250 1000	μA μA
I_{GSS}	Gate-body Leakage Current ($V_{DS} = 0$)	$V_{GS} = \pm 20\text{ V}$			± 100	nA

ON (*)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$ $I_D = 250\text{ }\mu\text{A}$	2	3	4	V
$R_{DS(on)}$	Static Drain-source On Resistance	$V_{GS} = 10\text{ V}$ $I_D = 2.5\text{ A}$ $V_{GS} = 10\text{ V}$ $I_D = 2.5\text{ A}$ $T_c = 100\text{ }^\circ\text{C}$		1.9	2.4 4.8	Ω Ω
$I_{D(on)}$	On State Drain Current	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $V_{GS} = 10\text{ V}$	5.3			A

DYNAMIC

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$g_{fs} (*)$	Forward Transconductance	$V_{DS} > I_{D(on)} \times R_{DS(on)max}$ $I_D = 2.5\text{ A}$	2	4		S
C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = 0$		1190	1450	pF
C_{oss}	Output Capacitance			165	200	pF
C_{rss}	Reverse Transfer Capacitance			70	85	pF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Time	$V_{DD} = 400\text{ V}$ $I_D = 2.5\text{ A}$		50	65	ns
t_r	Rise Time	$R_G = 50\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 3)		85	105	ns
$(di/dt)_{on}$	Turn-on Current Slope	$V_{DD} = 640\text{ V}$ $I_D = 5.5\text{ A}$ $R_G = 50\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 5)		200		A/ μ s
Q_g	Total Gate Charge	$V_{DD} = V$ $I_D = 6\text{ A}$ $V_{GS} = 10\text{ V}$		75	95	nC
Q_{gs}	Gate-Source Charge			9		nC
Q_{gd}	Gate-Drain Charge			33		nC

SWITCHING OFF

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_r(V_{off})$	Off-voltage Rise Time	$V_{DD} = 640\text{ V}$ $I_D = 5.5\text{ A}$		120	150	ns
t_f	Fall Time	$R_G = 50\ \Omega$ $V_{GS} = 10\text{ V}$		30	40	ns
t_c	Cross-over Time	(see test circuit, figure 5)		160	200	ns

SOURCE DRAIN DIODE

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	Source-drain Current				5.3	A
$I_{SDM}^{(*)}$	Source-drain Current (pulsed)				20	A
$V_{SD}^{(*)}$	Forward On Voltage	$I_{SD} = 5.3\text{ A}$ $V_{GS} = 0$			2	V
t_{rr}	Reverse Recovery Time	$I_{SD} = 5.3\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 80\text{ V}$ $T_j = 150^\circ\text{C}$ (see test circuit, figure 5)		700		ns
Q_{rr}	Reverse Recovery Charge			7.7		μC
I_{RRM}	Reverse Recovery Current			22		A

(*) Pulsed: Pulse duration = 200 μs , duty cycle 15% (*) Pulse width limited by safe operating area

Safe Operating Areas For TO-218

Safe Operating Areas For ISOWATT218

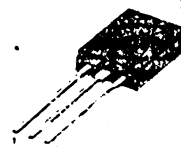
LM317

LINEAR INTEGRATED CIRCUIT

3-TERMINAL POSITIVE ADJUSTABLE REGULATOR

The LM317 is a 3-terminal adjustable positive voltage regulator capable of supplying in excess of 1.5A over an output voltage range of 1.2V to 37V. This voltage regulator is exceptionally easy to use and requires only two external resistors to set the output voltage. Further, it employs internal current-limiting, thermal-shutdown and safe area compensation, making it essentially blow-out proof. The LM317 serves a wide variety of applications including local, on card regulation. This device also makes an especially simple adjustable switching regulator, and a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the LM317 can be used as a precision current regulator.

TO-220

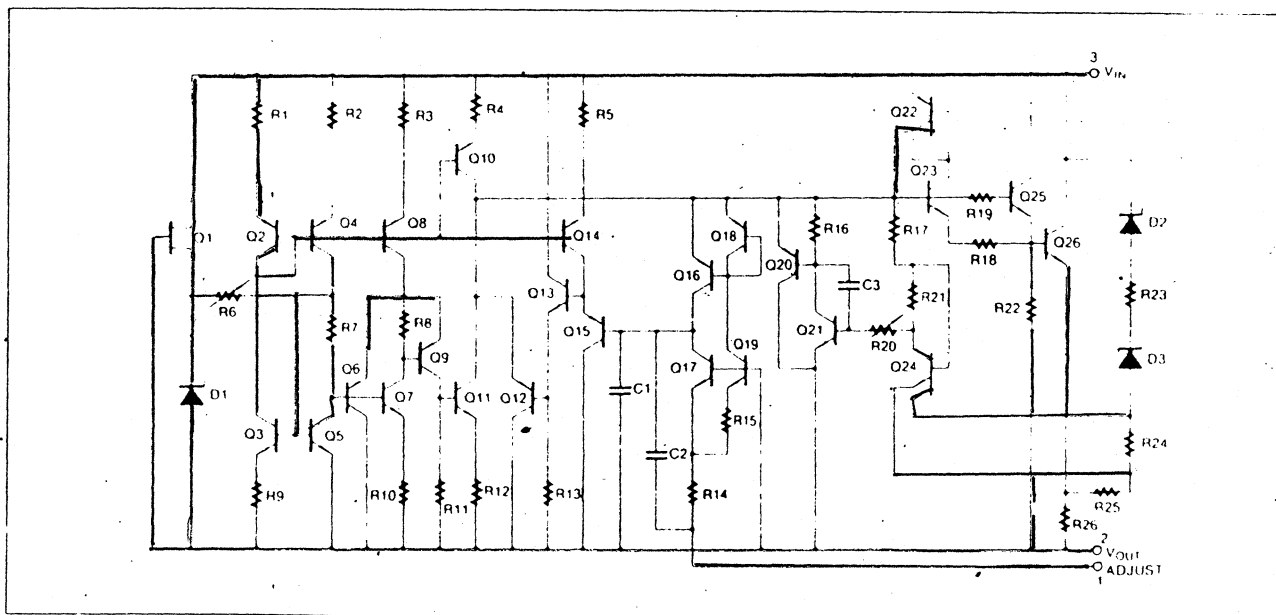


1: Adj 2: Output 3: Input

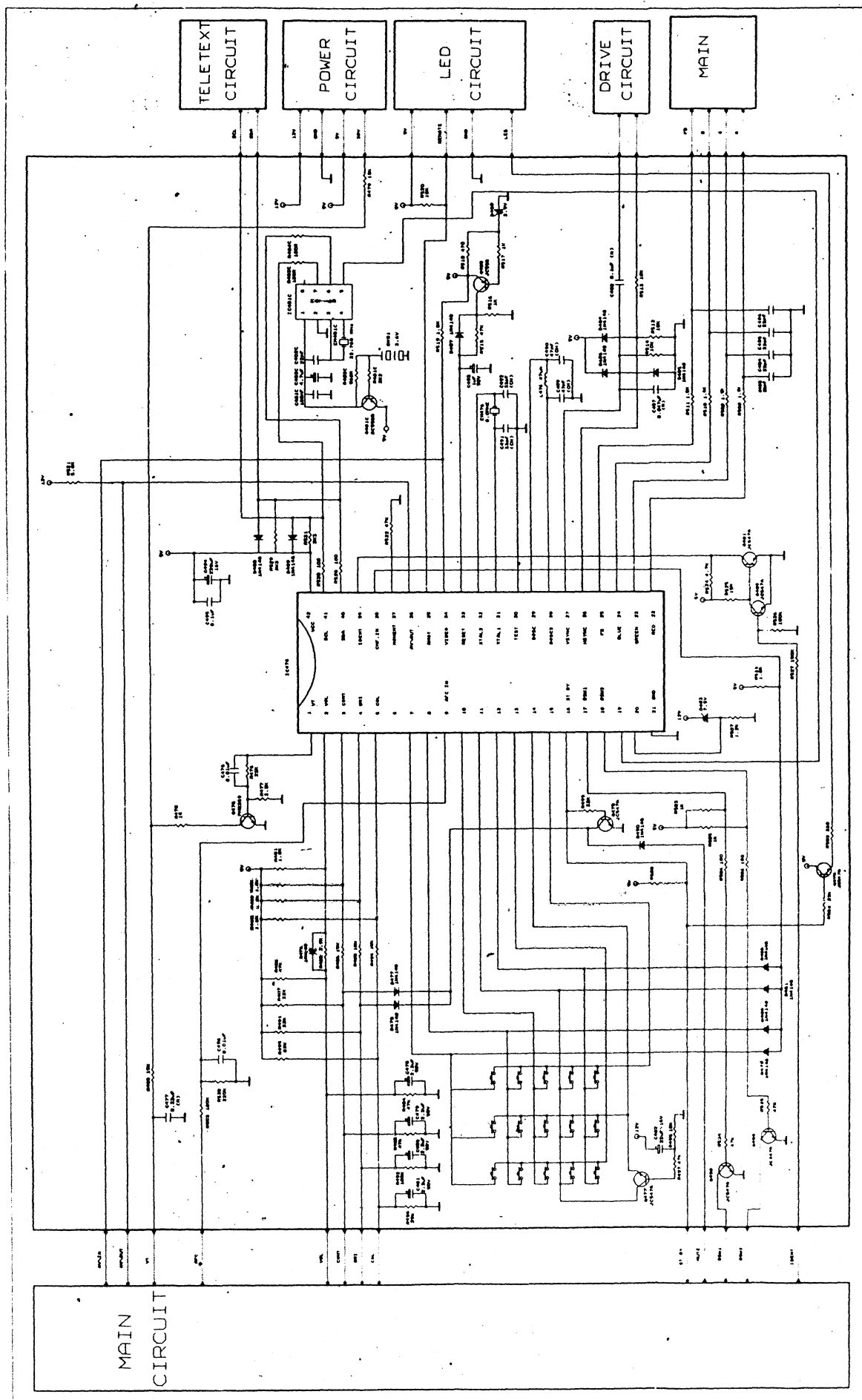
FEATURE

- Output current in excess of 1.5A
- Output adjustable between 1.2V and 37V
- Internal thermal-overload protection
- Internal short-circuit current-limiting constant with temperature
- Output transistor safe-area compensation
- Floating operation for high-voltage applications
- Standard 3-pin transistor packages.

SCHEMATIC DIAGRAM



CHANNEL SECTION



**MULTISTANDART TV
PROCESSOR
ANOLOG OPERATION SECTION**

ANALOG OPERATION PART

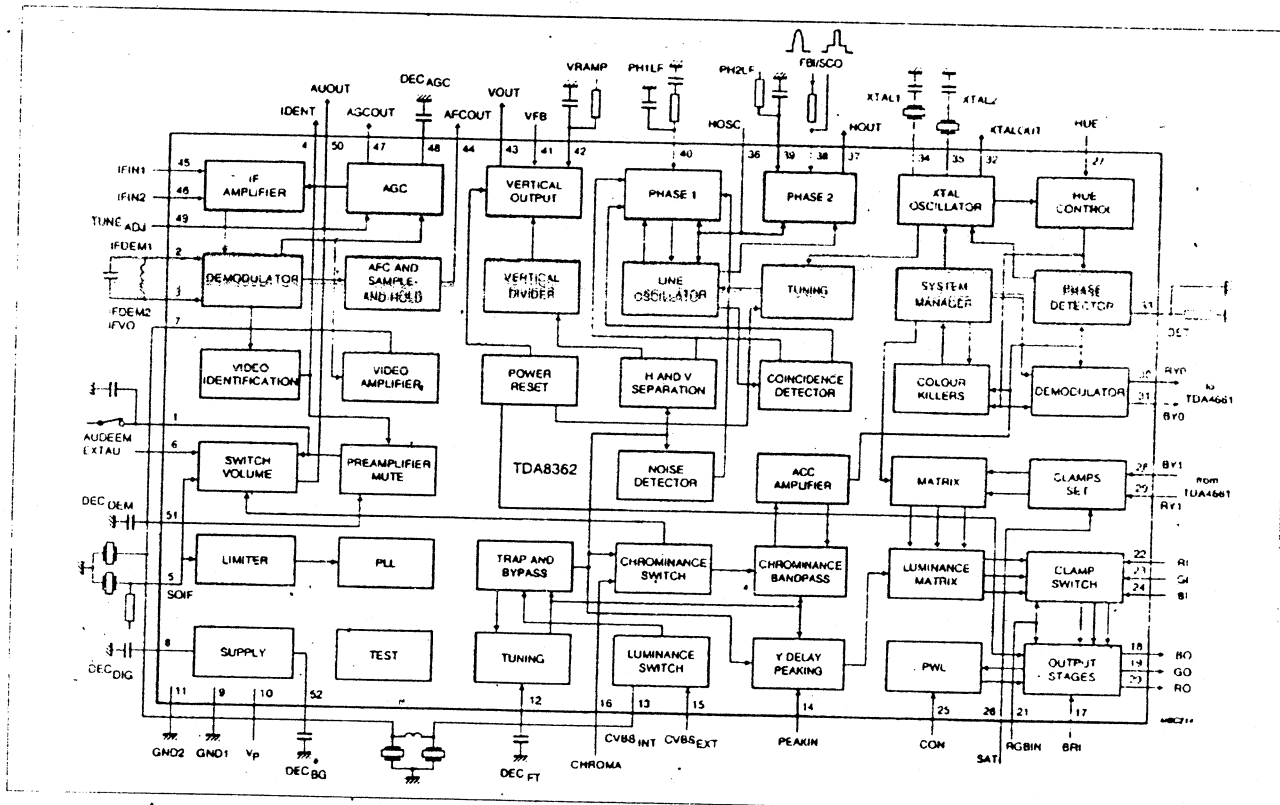
IC181 (TDA8362) which mounted on chassis does following operations: Picture IF, sound IF, colour decoder, horizontal oscillator, vertical oscillator and AFC.

The outputs of FI183 filter are connected to PIN 45 and 46 of IC181. Which are picture IF inputs. Here picture is amplified min 64 dB and given PIN 7. There is a buffer made of Q181. CCVS divide into two parts: Picture and sound. The picture IF gain is proportional to AGC voltage fixed by VR182 and R205. The AGC voltage output PIN is 47. PIN 44 is AFC output. When any station has been found exactly, there should be 4Vdc at PIN 44 (half of the supply voltage). PIN 4 is mute output and connected PIN 34 of uP. Approximately 5 minutes after station sign-off or a transmission failure, uP checks voltage at PIN 4. Five minutes after supply voltage cut-off, uP switched-on TV-set to standby. PIN 17, 25, 26 are brightness, contrast and colour inputs. T181 is demodulator coil and connected pins 2 and 3 of IC181. PIN 6 is external sound input, PIN 15 is external video input. When PIN 16 of IC181 has 0 Vdc, IC has been at normal TV operation. If PIN 16 of IC181 has 8Vdc IC has been at AV mode. PIN 22, 23, 24 external RGB inputs. PIN 21 is fast blanking (FB). PIN 30 and 31 are R-Y, B-Y outputs. This signals goes to B-Y, R-Y inputs at PINS 28 and 29 of IC181 VIA IC241 (base band delay line). IC251 secam decoder. PIN 35 is 4.43 MHz (EM182) crystal oscillator input. This crystal produces suitable frequency for colour decoder and after divides horizontal and vertical oscillator frequencies are obtained from this crystal. PIN 42 provides necessary voltage for operating of vertical RAMP generator. PIN 43 is vertical oscillator output and PIN 37 is horizontal oscillator output. PINS 18, 19, 20 are RGB output. After the signals are amplified on CRT board, the CRT is driven by signal. PIN 50 is sound output and comes to IC401 (TDA8425)

NOTE: Pin 50 is sound output and comes to IC401 and sound amplified by IC401 (TDA 1905) for mono chassis.

Block diagram

TDA8362



TDA8362 (IC181)

Multistandard TV processor

FEATURES

- Multistandard vision IF circuit (positive and negative modulation)
- Multistandard FM sound demodulator (4.5 MHz to 6.5 MHz)
- Video and audio switches (CVBS internal/external, S-VHS and audio internal/external)
- Integrated chrominance trap and bandpass filters (automatically calibrated)
- Integrated luminance delay line
- PAL/NTSC colour decoder with automatic search system
- Easy interfacing with the TDA8395 (SECAM decoder) for multistandard applications
- RGB control circuit with linear RGB inputs and fast blanking
- Horizontal synchronization with two control loops and alignment-free horizontal oscillator
- Vertical count-down circuit and vertical preamplifier
- Low dissipation (600 mW)
- Small amount of peripheral components compared with competition ICs
- Only one adjustment (video IF demodulator).

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _p	positive supply voltage	-	8.0	-	V
I _p	positive supply current	-	80	-	mA

Input voltages

V _{45.46(RMS)}	video IF amplifier sensitivity (RMS value)	-	70	-	µV
V _{5(RMS)}	sound IF amplifier sensitivity (RMS value)	-	1.0	-	mV
V _{6(RMS)}	external audio input (RMS value)	-	350	-	mV
V _{15(p-p)}	external CVBS input (peak-to-peak value)	-	1.0	-	V
V _{21(p-p)}	RGB inputs (peak-to-peak value)	-	0.7	-	V

Control voltages

V _{control}	control voltages for Volume, Contrast, Saturation, Brightness, Hue and Peaking	0	-	5.0	V
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Output signals

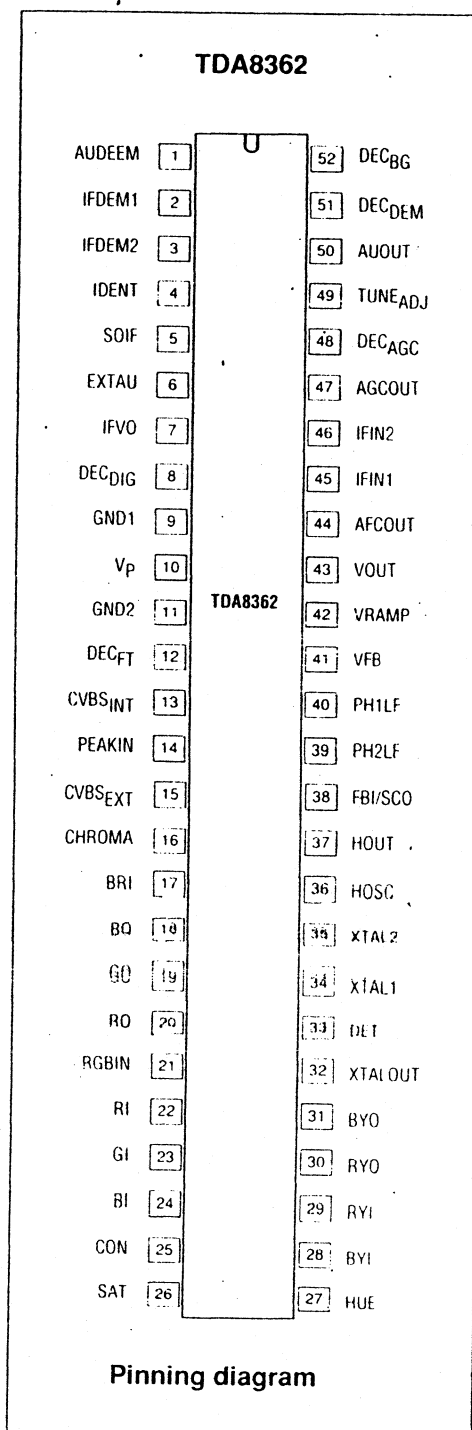
V _{2(p-p)}	demodulated CVBS output (peak-to-peak value)	-	2.5	-	V
V ₄₇	tuner AGC control voltage range	0	-	10	V
V ₄₄	AFC output voltage swing	-	6.0	-	V
V _{50(RMS)}	audio output voltage	-	700	-	mV
V _{18.20(p-p)}	RGB output signal amplitudes (peak-to-peak value)	-	4.0	-	V
I ₃₇	horizontal output current	10	-	-	mA
I ₄₃	vertical output current	1	-	-	mA

GENERAL DESCRIPTION

The TDA8362 contains nearly all small signal functions that are required for a colour television receiver. For a complete receiver the following circuits need to be added: a base-band delay line (TDA4661), a tuner and output stages for audio, video and horizontal and vertical deflection.

PINNING

SYMBOL	PIN	DESCRIPTION
AUDEEM	1	audio de-emphasis
IFDEM1	2	IF demodulator tuned circuit
IFDEM2	3	IF demodulator tuned circuit
IDENT	4	video identification output
SOIF	5	sound IF input and volume control
EXTAU	6	external audio input
IFVO	7	IF video output
DEC _{DIG}	8	decoupling digital supply
GND1	9	ground 1
V _p	10	positive supply voltage (+8V)
GND2	11	ground 2
DEC _{FT}	12	decoupling filter tuning
CVBS _{INT}	13	internal CVBS input
PEAKIN	14	peaking control input
CVBS _{EXT}	15	external CVBS input
CHROMA	16	chrominance and A/V switch input
BRI	17	brightness control input
BO	18	blue output
GO	19	green output
RO	20	red output
RGBIN	21	RGB insertion and blanking input
RI	22	red output
GI	23	green output
BI	24	blue output
CON	25	contrast control input
SAT	26	saturation control input
HUL	27	hue control input (or chrominance outp.)
BYI	28	B-Y input signal
RYI	29	R-Y input signal
RYO	30	R-Y output signal
BYO	31	B-Y output signal
XTALOUT	32	4.43 MHz output for TDA8395
DET	33	loop filter burst phase detector
XTAL1	34	3.58 MHz XTAL connection
XTAL2	35	4.43 MHz XTAL connection
HOSC	36	start horizontal oscillator
HOUT	37	horizontal output
FBI/SCO	38	flyback input/sandcastle output
PH2LF	39	phase 2 loop filter
PH1LF	40	phase 1 loop filter
VFB	41	vertical feedback input
VRAMP	42	vertical ramp generator
VOUT	43	vertical output
AFCOUT	44	AFC output
IFIN1	45	IF input 1
IFIN2	46	IF input 2
AGCOUT	47	tuner AGC output
DEC _{AGC}	48	AGC decoupling capacitor
TUNE _{ADJ}	49	tuner take-over adjustment
AUOUT	50	audio output
DEC _{DEM}	51	decoupling sound demodulator
DEC _{BG}	52	decoupling bandgap supply



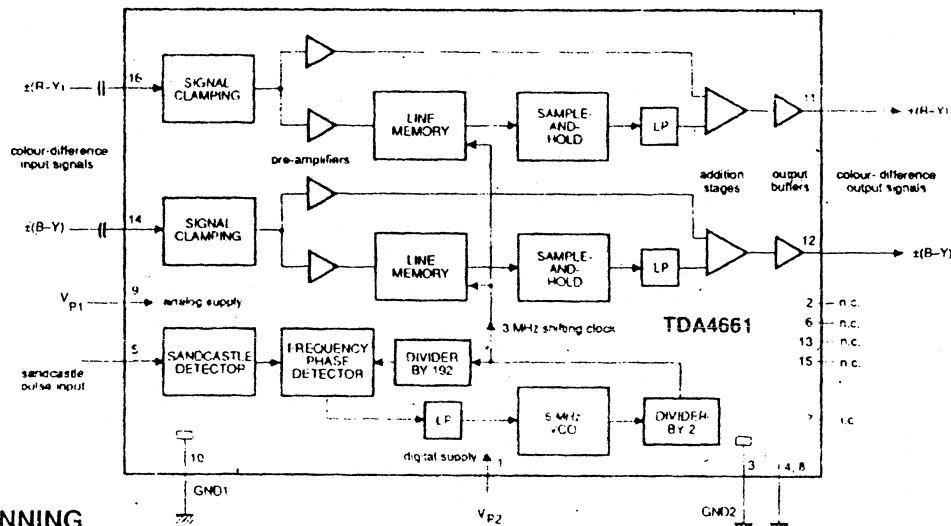
TDA4661 (IC241) baseband delay line

FEATURES

- Two comb filters, using the switched-capacitor technique, for one line delay time (64 μ s)
- Adjustment-free application
- No crosstalk between SECAM colour carriers (diaphoty)
- Handles negative or positive colour-difference input signals
- Clamping of AC-coupled input signals ($\pm(R-Y)$ and $\pm(B-Y)$)
- VCO without external components
- 3 MHz internal clock signal derived from a 6 MHz VCO, line-locked by the sandcastle pulse (64 μ s line)
- Sample-and-hold circuits and low-pass filters to suppress the 3 MHz clock signal
- Addition of delayed and non-delayed output signals
- Output buffer amplifiers
- Comb filtering functions for NTSC colour-difference signals to suppress cross-colour

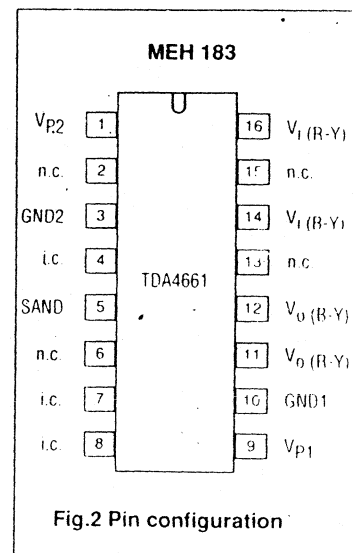
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{P1}	analog supply voltage (pin 9)	4.5	5	6	V
V_{P2}	digital supply voltage (pin 1)	4.5	5	6	V
$I_{P\text{ tot}}$	total supply current	-	4.7	9.4	mA
V_i	$\pm(R-Y)$ input signal PAL/NTSC (peak-to-peak value, pin 16)	-	525	-	mV
	$\pm(B-Y)$ input signal PAL/NTSC (peak-to-peak value, pin 14)	-	665	-	mV
	$\pm(R-Y)$ input signal SECAM (peak-to-peak value, pin 16)	-	1.05	-	V
	$\pm(B-Y)$ input signal SECAM (peak-to-peak value, pin 14)	-	1.33	-	V
G_V	gain V_0 / V_i of colour-difference output signals				
	V_{11} / V_{16} for PAL and NTSC	5.5	6.0	6.5	dB
	V_{12} / V_{14} for PAL and NTSC	5.5	6.0	6.5	dB
	V_{11} / V_{16} for SECAM	-0.5	0	+0.5	dB
	V_{12} / V_{14} for SECAM	-0.5	0	+0.5	dB



PINNING

SYMBOL	PIN	DESCRIPTION
V_{P2}	1	+5 V supply voltage for digital part
n.c.	2	not connected
GND2	3	ground for digital part (0 V)
i.c.	4	internally connected
SAND	5	sandcastle pulse input
n.c.	6	not connected
i.c.	7	internally connected
i.c.	8	internally connected
V_{P1}	9	+5 V supply voltage for analog part
GND1	10	ground for analog part (0 V)
$V_0(R-Y)$	11	$\pm(R-Y)$ output signal
$V_0(B-Y)$	12	$\pm(B-Y)$ output signal
n.c.	13	not connected
$V_i(B-Y)$	14	$\pm(B-Y)$ input signal
n.c.	15	not connected
$V_i(R-Y)$	16	$\pm(R-Y)$ input signal



SECAM decoder TDA8395 (IC251)

FEATURES

- Fully integrated filters
- Alignment free
- For use with baseband delay

GENERAL DESCRIPTION

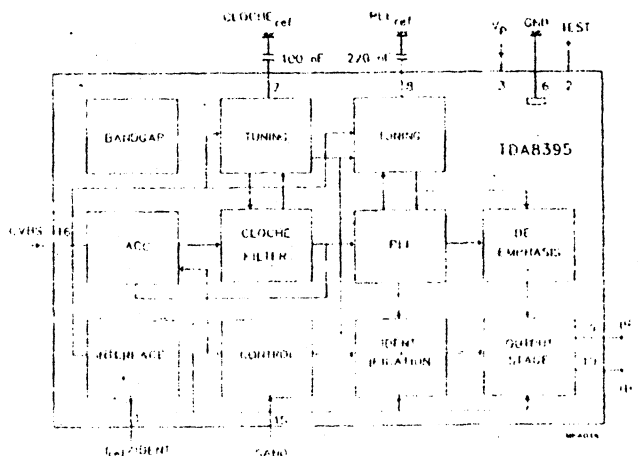
The TDA8395 is a self-calibrating, fully integrated SECAM decoder. The IC should preferably be used in conjunction with the PAL/NTSC decoder TDA8362 or TDA8366 and with the switched capacitor baseband delay circuit TDA4660. The IC incorporates HF and LF filters, a demodulator and an identification circuit (luminance is not processed in this IC). The IC needs no adjustments and very few external components are required. A highly stable reference frequency is required for calibration and a two level sandcastle pulse for blanking and burst gating.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_p	positive supply voltage (pin 3)	7.2	-	8.8	V
P_{tot}	total power dissipation	-	-	220	mW
$V_{16(p-p)}$	composite video input voltage (peak-to-peak value); pin 16	-	1.0	1.5	V
$V_{o(p-p)}$	$\pm(R-Y)$ output voltage amplitude (peak-to-peak value); pin 9	-	1.05	-	V
$V_{o(p-p)}$	$-(B-Y)$ output voltage amplitude (peak-to-peak value); pin 10	-	1.33	-	V

ORDERING INFORMATION

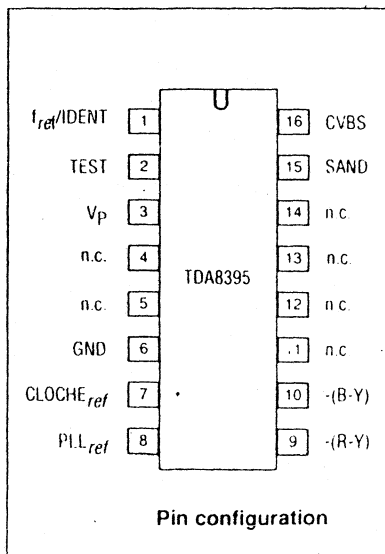
EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA8395	16	DIL	plastic	SOT38GE1



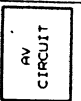
Block diagram

PINNING

SYMBOL	PIN	DESCRIPTION
f_{ref} IDENT	1	reference frequency input/identification input
TEST	2	test output
V_p	3	positive supply voltage
n.c.	4	not connected
n.c.	5	not connected
GND	6	ground
$CLOCHE_{ref}$	7	Cloche reference filter
PLL_{ref}	8	PLL reference
$-(R-Y)$	9	$-(R-Y)$ output
$-(B-Y)$	10	$-(B-Y)$ output
n.c.	11	not connected
n.c.	12	not connected
n.c.	13	not connected
n.c.	14	not connected
SAND	15	sandcastle pulse input
CVBS	16	video (chrominance) input



Pin configuration



AF AMPLIFIER CIRCUIT

TDA1905 is used as the amplifier element in SM-1 mono chassis.

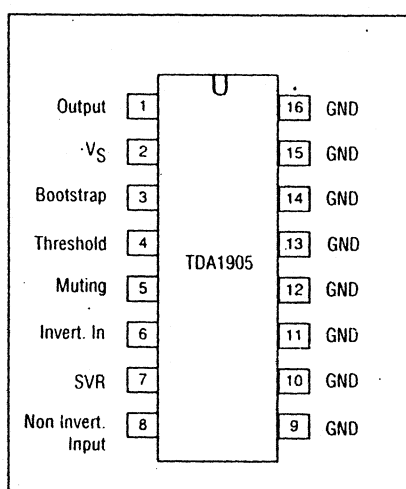
This IC is enclosed in a dual in-line envelope with 16 pins, of which 8 pins (all on one side) are connected with the internal copper frame so that, together with a small copper heat sink plate. Good dissipation of waste heat is insured. The heat sink is immersion soldered together with the IC.

An internal, thermal overload circuit prevents damage due to overheating should there be a short at the load resistance. A frequency dependent degenerative feedback is realized with the components between pins 1 and 6.

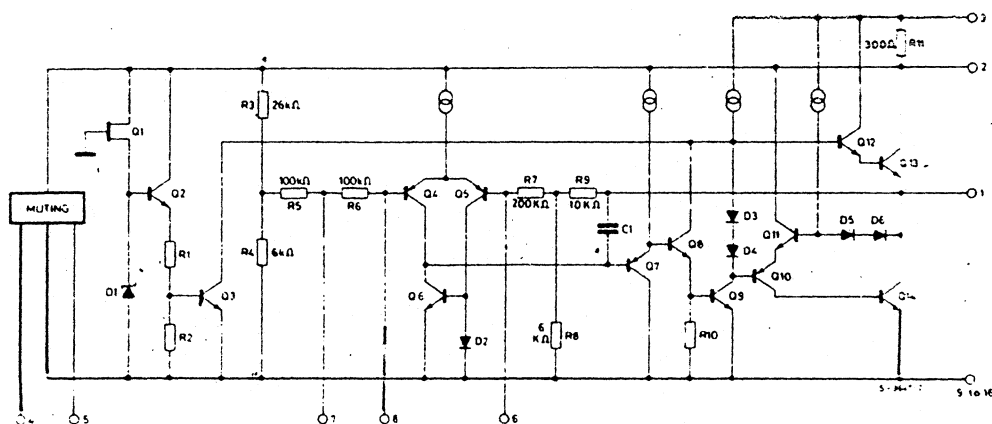
The low frequencies are thus boosted by about 4 db, rounding out the sound. The bootstrap condenser C 405 improves efficiency by elevating the voltage in the driver stage, which at the same time means higher performance. C 409 serves to suppress hum.

CONNECTION DIAGRAM

(Top view)



SCHEMATIC DIAGRAM



THERMAL DATA

$R_{thj \text{ case}}$	Thermal resistance junction-pins	max	15 °C/W
$R_{thj \text{ amb}}$	Thermal resistance junction-amb	max	70 °C/W

PFC84C81/C (IC727)

SINGLE-CHIP 8-BIT MICROCONTROLLERS WITH I²C-BUS INTERFACE

DESCRIPTION

An advanced CMOS process is used to manufacture the PCF84C00, PCF84C21/C, PCF84C41/C and PCF84C81/C microcontrollers. The PCF84C21C, PCF84C41C and PCF84C81C operate at a higher clock frequency. Each device has 20 quasi-bidirectional I/O port lines, a serial I/O interface, a single, level vectored interrupt structure, an 8-bit timer/event counter and on-chip clock oscillator and clock circuits.

On-chip RAM and ROM content is as follows:

• **PCF84C00** - 256 x 8 RAM, external program memory

• **PCF84C21** - 64 x 8 RAM, 2 K x 8 ROM

• **PCF84C41** - 128 x 8 RAM, 4 K x 8 ROM

• **PCF84C81** - 256 x 8 RAM, 8 K x 8 ROM

These efficient controllers also perform well as arithmetic processors. They have facilities for both binary and 8CD arithmetic plus bit-handling capabilities. The instruction set is similar to that of the MAB8048.

These microcontrollers are members of the PCF84CXXX family.

For detailed information, consult the PCF84CXXX data sheet.

FEATURES

- 8-bit CPU, ROM, RAM, I/O in a single 28-lead DIL or SO package
- 2 K, 4 K or 8 K x ROM; also a ROM-less version
- 64, 128 or 256 x 8 RAM
- 20 quasi-bidirectional I/O port lines
- Two test inputs, one of which is also the external interrupt input
- Single-level vectored interrupts: external, timer/event counter and serial I/O
- I²C hardware interface for serial data transfer on two lines (serial I/O data via an existing port line and clock via a dedicated line)
- 8-bit programmable timer/event counter
- Clock frequency range: 100 kHz to 10 MHz; C versions: 1 MHz to 12 MHz
- Over 80 instructions (similar to those of the MAB8048) all of 1 or 2 cycles
- Single supply voltage (2.5 to 5.5 V)
- STOP and IDLE modes
- Power-on reset circuit
- Operating temperature range: -40 to +85°C
- High current on Port 1: I_{OL} = 10 mA at V_{OL} = 1.2 V (all versions except the PCF84C00).

For following sections see PCF84CXXX family data sheet

Program memory
Data memory
Program counter stack
IDLE and STOP modes
I/O facilities
Serial I/O
Interrupts
Oscillator
Timer/event counter
Program status word

Program counter
Central processing unit
Conditional branch logic
Test input T1

Power-on reset
Instruction set

PACKAGE OUTLINES

PCF84C21/41/81P :28-lead DIL; plastic (SOT117).

PCF84C21/41/81T :28-lead mini-pack; plastic (SO28; SOT 136A).

PCF84C00B :28-lead 'piggy back' package (supports up to 28-pin EPROM).

PCF84C00T :56-lead mini-pack; plastic (VSO56; SOT 190).

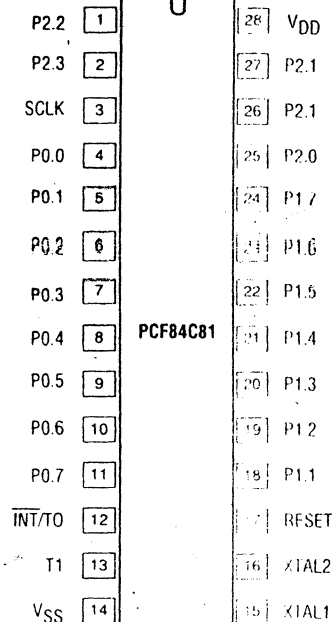
PIN DESIGNATION

Pin	Symbol	Type
3	SCLK	I/O
4-11	P0.0-P0.7	I/O
12	INT/T0	I
13	T1	I
14	V _{SS}	I
15	XTAL 1	I
16	XTAL 2	I/O
17	RESET	I/O
18-25	P1.0-P1.7	I/O
26, 27, 1, 2	P2.0-P2.3	I/O
28	V _{DD}	I

Function

Clock: bidirectional clock for serial I/O.
Port 0: 8-bit quasi-bidirectional I/O port.
Interrupt/Test 0: external interrupt input (negative edge triggered) / test input pin: when used as a test input, this pin is directly tested by conditional branch instructions JT0 and JNT0.
Test 1: test input pin, directly tested by conditional branch instructions JT1 and JNT1. T1 may also be selected as an input to the 8 bit timer/event counter via the STRT.CNT instruction.
Ground: circuit earth potential.
Oscillator input: input from a crystal which determines the internal oscillator frequency or an external clock generator.
Oscillator output: output of the inverting amplifier.
Reset input: used to initialize the microcontroller (active HIGH) also output of power-on-reset circuit.
Port 1: 8-bit quasi-bidirectional I/O port.
Port 2: 4 bit quasi-bidirectional I/O port. P2.3 is the serial data input/output in serial I/O mode.
Power supply: 2.5 V to 5.5 V.

PINNING



Pinning diagram

TELETEXT CIRCUIT

Teletext stage consist of SAA5243, SAA5231 and GM76C88AL15 (8K8SRAM)

Note: SAA5345 should be used instead of SAA5243 and 8K8 SRAM). Video signal goes to PIN 27 of IC (SAA5231). Analog signal translated to digital signal by SAA5231. PINS 18 and 20 IC730 oscillator input-output and operates with a xtal (EM727) 6MHz. IC728 (SAA5243P) is teletext decoder. PIN 19 of teletext decoder is SCL (Serial Clock) and PIN 20 is SDA (Serialdata) control. Text data in video signal that comes to IC728 (SAA5243) are separated in IC728 and R, G, B signal are produced by IC728. RGB signal go out from IC728 via pins 13, 14, 15. PIN 17 of IC is for fast blanking. PIN 8 is used by adjusting vertical deflection current. Therefore a vision can be obtained without flicker.

PCF84C81 (IC727) = This IC is a uP and converts SDA and SCL datas for 5243 to a form so that SAA5243 can evaluate.

8K8 SRAM (IC729) = This IC is a static ram and its memory 4 page at the same time for fastext system. When a new page is selected, memory IC changes its memory according to new page.

SAA5231 (IC730)

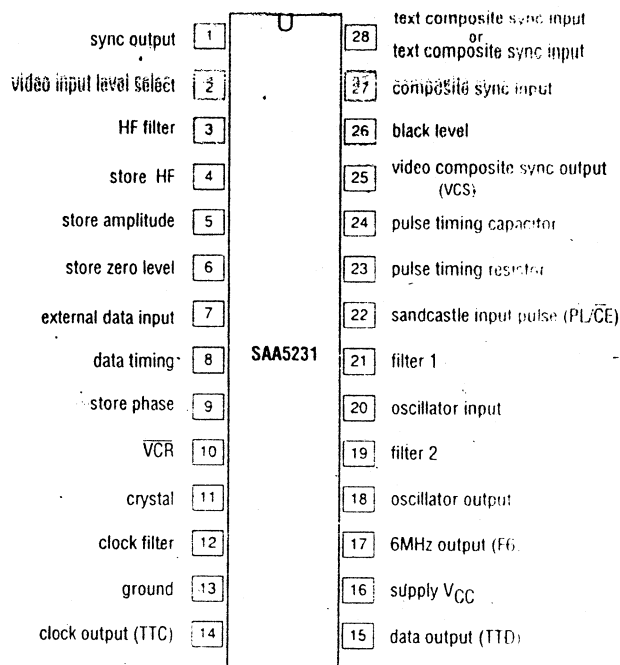
Teletext video processor

GENERAL DESCRIPTION

The SAA5231 is a bipolar integrated circuit intended as a successor to the SAA5030. It extracts Teletext Data from the video signal, regenerates Teletext Clock and synchronizes the text display to the television syncs. The integrated circuit is intended to work in conjunction with CCT (Computer Controlled Teletext), EUROM or other compatible devices.

FEATURES

- Adaptive data slicer
- Data clock regenerator
- Adaptive sync separator, horizontal phase detector and 6 MHz VCO forming display phase locked loop (PLL)

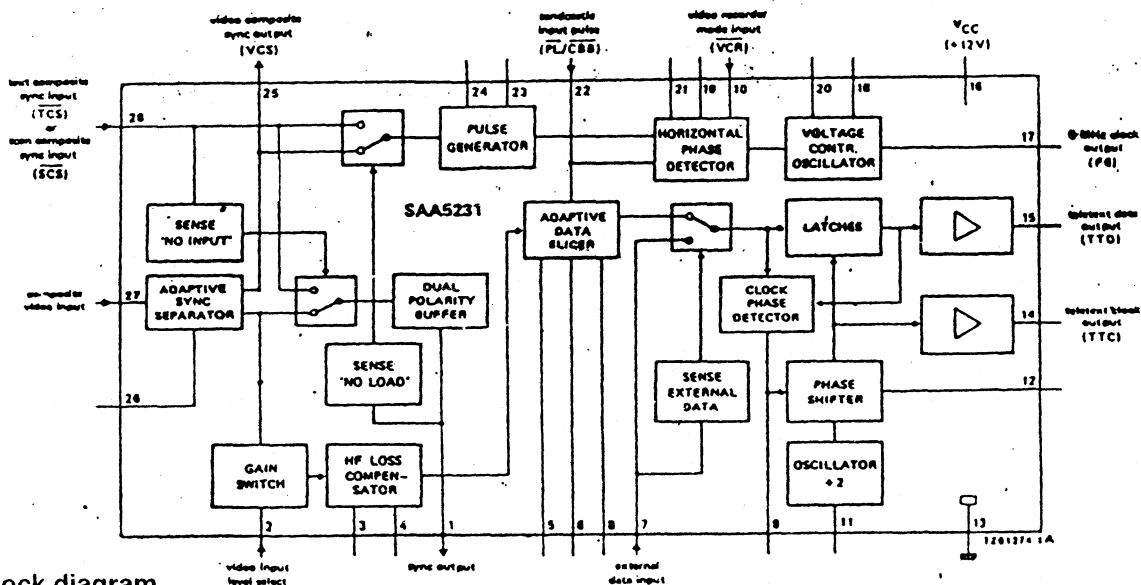


QUICK REFERENCE DATA

Supply voltage (pin 16)	V _{CC}	typ.	12 V
Supply current (pin 16)	I _{CC}	typ.	70 mA
Video input amplitude (pin 27) (peak-to-peak value)	V _{27-13(p-p)}	typ.	1 V
pin 2 LOW	V _{27-13(pp)}	typ.	2.5V
pin 2 HIGH			
Storage temperature range	T _{stg}		-20 to ± 125 °C
Operating ambient temperature range	T _{amb}		0 to + 70 °C

PACKAGE OUTLINE

28-lead dual in-line; plastic (SOT117).



Block diagram

SAA5243 (IC728)

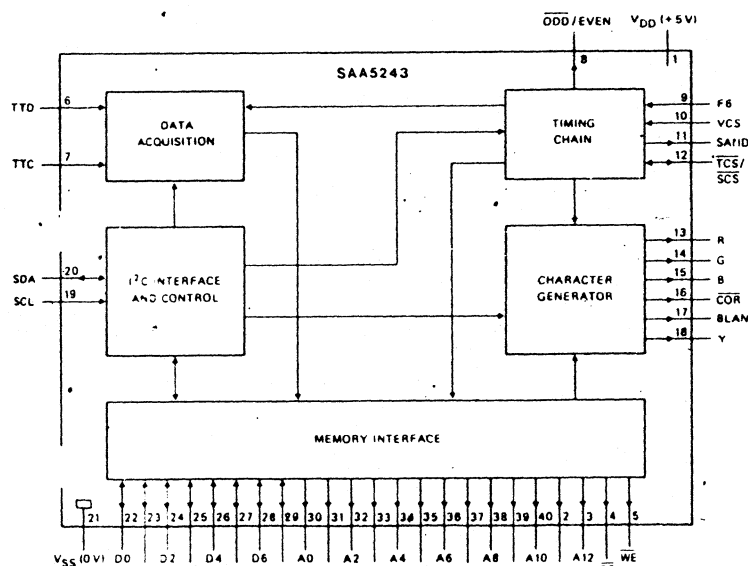
Enhanced Computer Controlled Teletext Circuit (ECCT)

GENERAL DESCRIPTION

The SAA5243 is a MOS N-channel integrated circuit which performs all the digital logic functions of a 625-line World System Teletext decoder. It operates in conjunction with the teletext video processor SAA5231, standard static RAMs and is controlled via the 2-wire I²C bus. The device can be used to provide videotex display conforming to a serial

FEATURES

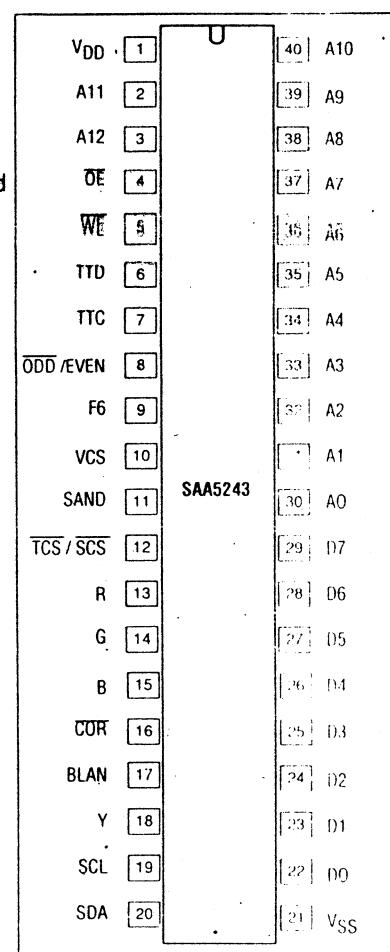
- Microcomputer controlled for flexibility
- High quality flicker-free display using a 12x10 character matrix
- Field flyback (lines 2 to 22), or full channel (all lines) data acquisition
- Up to four simultaneous page requests enabling acquisition during one magazine cycle
- Direct interface up to 8 K bytes static RAM
- Automatic language section of up to seven different languages
- 25th display row for software generated status messages
- Cursor control for videotex-teleoftware
- 7-bits parity or 8-bit data acquisition
- Extension packet reception option
- Standard I²C bus slave transceiver (slave address 0010001)
- Single 5 volt power supply
- Mask programmable character sets
- Slave sync mode operation
- Odd/even field output for de-interlaced displays



Block diagram

PINNING

1	V _{DD}	Power supply: + 5 V power supply pin.
2,3,40	A11, A12, A10	Chapter Address: three outputs that select which 1 Kbyte chapter of external RAM is being accessed for any read or write cycle.
4	OE	Output Enable: active low output signal used to control the reading of the external RAM. It occurs continuously at a 1 MHz rate.
5	WE	Write Enable: active low output signal used to control the writing of data to the external RAM. It occurs for a valid write cycle only and is interleaved with the read cycles.
6	TTD	Teletext Data: input from the SAA5231 Video Input Processor (VIP2). It is clamped to V _{SS} for 4 to 8 µs of each television line to maintain the correct c.d.c. level following the external a.c. coupling.
7	TTC	Teletext Clock: 6.9375 MHz clock input from the SAA5231. It is internally a.c. coupled to an active clamp input buffer.
8	ODD/EVEN	Odd/Even: for interlaced mode, the output changes once per field at 2 µs before the end of line 311 (624). The output is high for even fields and low for odd fields.
9	F6	Character display clock: 6 MHz clock input from the SAA5231. It is internally a.c. coupled to an active clamp input buffer.
10	VCS	Video Composite Sync: input from the SAA5231 derived from the incoming video signal. Sync pulses are active high.
11	SAND	Sandcastle: 3-level sandcastle output to the SAA5231 containing the phase locking and colour burst blanking information.
12	TCS/SCS	Text Composite Sync/Scan Composite Sync: as an output an active low composite sync waveform (TCS) with interlaced or noninterlaced format which is fed to the SAA5231 to drive the display timebases. Alternatively this pin can act as an input for an active low composite sync waveform (SCS) so 'slave' the display timing circuits.
13, 14, 15	R, G, B	Red, Green, Blue: these 3 open drain outputs are the character video signals to the television display circuits. They are active high and contain character and background information.
16	COR	Contrast Reduction: open drain, active low output which allows selective contrast reduction of the television picture to enhance a mixed mode display.
17	BLAN	Blanking: open drain, active high output which controls the blanking of the television picture for a normal text display and for a mixed display.
18	Y	Character foreground: open drain, active high video output signal containing all the foreground information displayed on the television screen (e.g. for driving a display printer).
19	SCL	Serial Clock: input signal which is the I ² C bus clock from the microcontroller.
20	SDA	Serial Data: is the I ² C bus data line. It is an input/output function with an open drain output.
21	V _{SS}	Ground: 0 volts.
22-29	DO-D7	8 RAM data lines: 3-state input/output pins which carry the data bytes to and from the external RAM.
30-39	AO-A9	RAM address: 10 output signals that determine which byte location within a 1 Kbyte chapter of external RAM is accessed for any read or write cycle.



STV5345

STV5345/H - STV5345/T

(IC728)

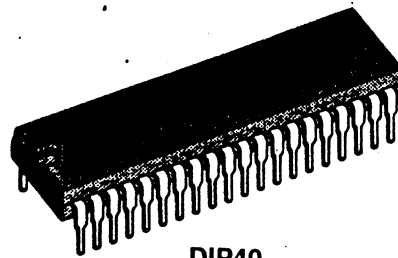
TELETEXT DECODER WITH 8 INTEGRATED PAGES

PRELIMINARY DATA

- Complete teletext decoder including on-chip 8 pages memory, reducing EMC radiations
- Upward software and hardware compatible with previous SGS-THOMSON's decoder SDA5243
- Direct interface to an external static ram of 8 Kbytes for up to 16 pages application
- Automatic selection of up to six national languages
- Four simultaneous page requests
- Display of the 25th status row
- Microprocessor control via an I²C bus (slave address 0010001 R/W)
- Data acquisition available from lines 2 to 22 or from a complete field
- High quality display using a character matrix of 12 x 10 dots
- Single + 5V supply voltage
- On-chip mask programmable rom character generators
- Hcmos process

DESCRIPTION

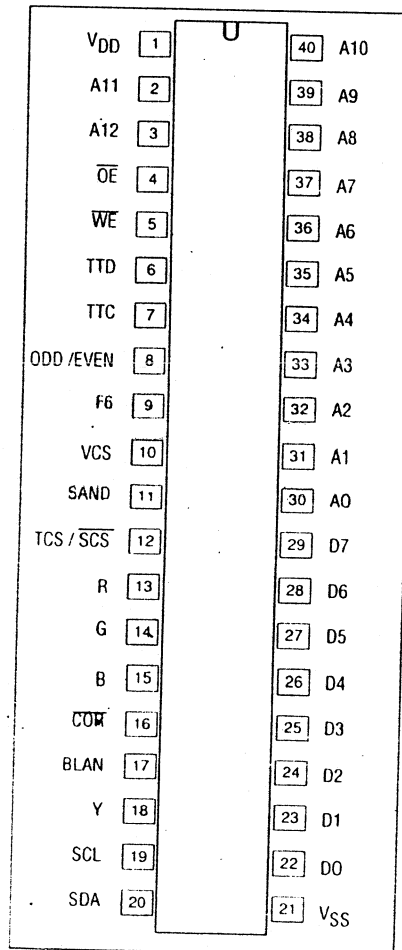
The STV5345 is a HCMOS integrated circuit which performs all the processing of logical data within a 625 lines system teletext decoder. It is designed to operate in conjunction with one-chip: the SAA5231 integrated chip which extracts Teletext information embedded in a composite video signal. Up to 8 pages of display data can be stored in internal memory. Using 8 Kbytes of external memory leads to a 16 pages application. A complete system also comprises a microprocessor controlling the STV5345 via a 2-wires serial bus. An on-chip ROM memory contains the character sets. The STV5345 performs automatic selection of one of up to six natural languages. Data bytes may be decoded in either 7-Bit plus parity or in full 8-Bit formats. The chip set also supports facilities for reception and display of higher-level protocol data.



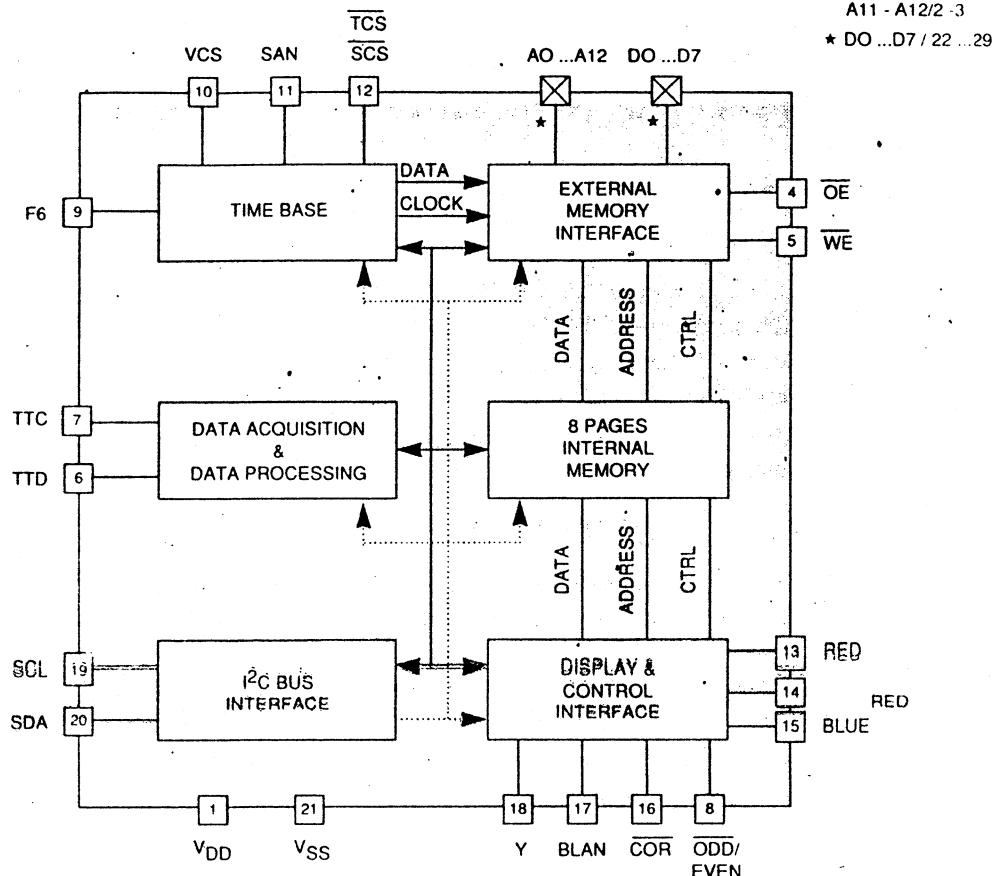
DIP40
(Plastic Package)

ORDER CODE: STV5345 . West European
STV5345/H East European
STV5345/T Turkish & European

PIN CONNECTIONS



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DD}	Power Supply Range	-0.3, +6.0	V

INPUT VOLTAGE RANGE:

V_I	VCS, SDA, SCL, DO-D7	-0.3, $V_{DD} + 0.5$	V
V_I	TTD, F6, TCS/SCS, TTC	-0.3, +10	V

OUTPUT VOLTAGE RANGE:

V_O	SAND, AO-A12, OE, WE, DO-D7, SDA, ODD/EVEN, R,G,B	-0.3, V_{DD}	V
V_O	BLAN, COR, Y, TCS/SCS	-0.3, V_{DD}	V
T_{stg}	Storage Temperature Range	-20, +125	°C
T_A	Operating Ambient Temperature Range	-20, +70	°C

ELECTRICAL CHARACTERISTICS

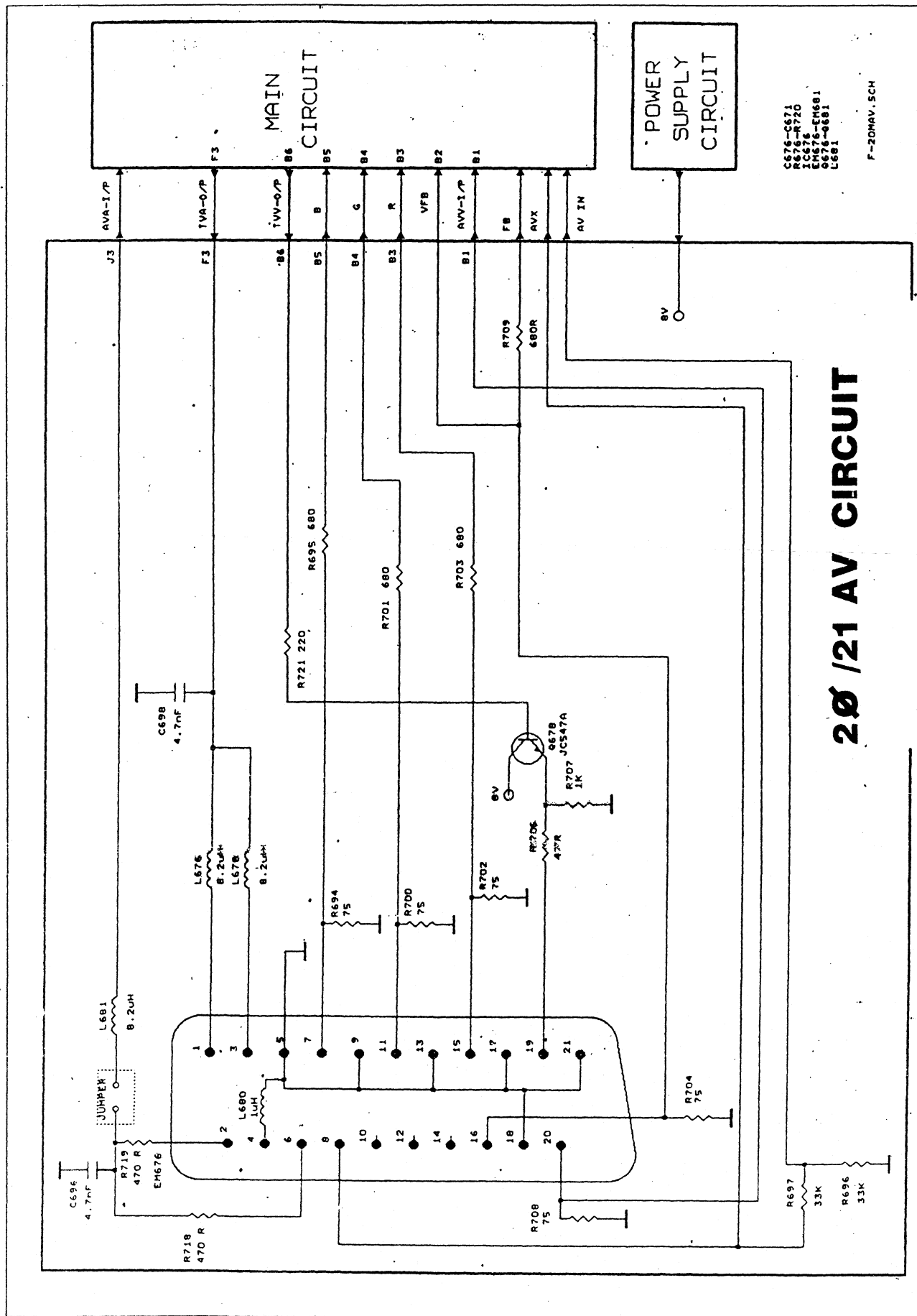
$V_{DD} = 5V$, $V_{SS} = 0V$, $T_A = -20$ to $+70^\circ C$

Symbol	Parameter	Min	Typ	Max	Unit
V_{DD}	Supply Voltage (Pin 1)	4.5	5	5.5	V
I_{DD}	Supply Current (operating mode)		TBD		mA

PIN DESCRIPTION

Pin	Symbol	Function	Description
1	V _{DD}	+5V	Positive supply voltage
2,3,40*	A11, A12, A10	Chapter address	Address selection outputs for 1 of 8 external static RAM chapters each of 1 Kbytes.
4*	$\overline{OE}$	Output enable	Active-low external static RAM output enable control signal.
5*	$\overline{WE}$	Write enable	Active-low external static RAM write enable control signal. It supports write-cycles interleaved with read-cycles.
6	TTD	Teletext data input	An A.C. coupled teletext data input supplied by the SAA5231 chip is latched to V _{SS} between 4 and 8 μ s after each TV line.
7	TTC	Teletext clock input	A 6.9375MHz clock signal, supplied by the SAA5231 chip, is internally A.C. coupled, clamped and buffered.
8	ODD/EVEN	Interlaced mode state output	High for even numbered and low for odd-numbered frames. The value is valid 2 μ s before the end of lines 311 and 624.
9	F6	Character display clock signal	The 6MHz clock signal, supplied by the SAA5231 chip is internally A.C. coupled, clamped and buffered.
10	VCS	Video composite synchronization input signal	Active high VCS input.
11	SAND	Sandcastle	Three level output pulse to the SAA5231 device. Phase lock, blanking signal, and color burst components are contained in this signal.
12	$\overline{TCS}/\overline{SCS}$	Input / output composite synchronization signal	Scan composite input signal ($\overline{SCS}$) for the display - synchronization or Text composite sync. ($\overline{TCS}$) output signal to the SAA5231. Both signals are active low.
13,14,15	R G B	Red, green, blue	Character and background colors active-high open-drain outputs.
16	$\overline{COR}$	Contrast reduction	Open-drain active-low output supporting optimal display of characters in "mixed mode" operation.
17	BLAN	Blanking signal output	Open-drain active high output for TV-image blanking in normal and mixed-mode operation.
18	Y	Foreground output	Open-drain active-high output with foreground information. Can be used for printer command.
19	SCL	Serial clock	Microprocessor clock input via serial bus.
20	SDA	Serial data input / output	Open-drain microprocessor serial data input/output via serial bus.
21	V _{SS}	0 Volt	Ground.
22-29*	D0-D7	Parallel data input / output	Eight tri-state input/output for data read/write from/to an external static RAM.
30-39*	A0-A9	Address signals	Ten addresses output pins for accessing to individual Bytes of a 1 Kbyte chapter stored in an external Static RAM.

*Pins only activated when 8KBytes of external memory are addressed, otherwise pins $\overline{OE}$ and $\overline{WE}$ remain high, and others remain low.



A/V SCART

- 1- Audio output 1. right channel 0.5 VRMS / < 1kohm
- 2- Audio input 1. right channel 0.5 VRMS (connected to no. 6)
- 3- Audio output 2. left channel 0.5 VRMS (connected to no.1)
- 4- GND (audio)
- 5- GND
- 6- Audio input 2. left channel 0.5 VRMS / >10kohm
- 7- RGB input, blue (B)
- 8- Switch signal video (status)
- 9- GND
- 10- Reserved for clock signal (not connected)
- 11- RGM input, green (G)
- 12- Reserved for remote control (not connected)
- 13- GND
- 14- GND switch signal RGB
- 15- RGB input, red (R)
- 16- Switch signal RGB
- 17- GND (video)
- 18- GND
- 19- Video output 1 Vpp/75ohm
- 20- Video input 1 Vpp/75ohm
- 21- Shield

DRIVE CIRCUIT

The schematic diagram illustrates the internal circuitry of a television receiver, organized into four main functional blocks:

- POWER CIRCUIT:** This section handles the incoming AC power (120V). It includes a power transformer (T1) with primary taps for 120V and 12V. The secondary provides power to the main circuit (12V), the channel circuit (12V), and the CRT circuit (100V/15V). A fuse (F1) is connected to the 120V line. A 100V/15V transformer (T2) is used for the CRT heater and filament supply.
- MAIN CIRCUIT:** This block contains the core electronic components. It starts with an IC 577 (a 7-pin integrated circuit) which is connected to the 12V supply. The circuit includes several transistors (e.g., 2N4350, 2N4351, 2N4352, 2N4353, 2N4354, 2N4355, 2N4356, 2N4357, 2N4358, 2N4359, 2N4360, 2N4361, 2N4362, 2N4363, 2N4364, 2N4365, 2N4366, 2N4367, 2N4368, 2N4369, 2N4370, 2N4371, 2N4372, 2N4373, 2N4374, 2N4375, 2N4376, 2N4377, 2N4378, 2N4379, 2N4380, 2N4381, 2N4382, 2N4383, 2N4384, 2N4385, 2N4386, 2N4387, 2N4388, 2N4389, 2N4390, 2N4391, 2N4392, 2N4393, 2N4394, 2N4395, 2N4396, 2N4397, 2N4398, 2N4399, 2N4400, 2N4401, 2N4402, 2N4403, 2N4404, 2N4405, 2N4406, 2N4407, 2N4408, 2N4409, 2N4410, 2N4411, 2N4412, 2N4413, 2N4414, 2N4415, 2N4416, 2N4417, 2N4418, 2N4419, 2N4420, 2N4421, 2N4422, 2N4423, 2N4424, 2N4425, 2N4426, 2N4427, 2N4428, 2N4429, 2N4430, 2N4431, 2N4432, 2N4433, 2N4434, 2N4435, 2N4436, 2N4437, 2N4438, 2N4439, 2N4440, 2N4441, 2N4442, 2N4443, 2N4444, 2N4445, 2N4446, 2N4447, 2N4448, 2N4449, 2N4450, 2N4451, 2N4452, 2N4453, 2N4454, 2N4455, 2N4456, 2N4457, 2N4458, 2N4459, 2N4460, 2N4461, 2N4462, 2N4463, 2N4464, 2N4465, 2N4466, 2N4467, 2N4468, 2N4469, 2N4470, 2N4471, 2N4472, 2N4473, 2N4474, 2N4475, 2N4476, 2N4477, 2N4478, 2N4479, 2N4480, 2N4481, 2N4482, 2N4483, 2N4484, 2N4485, 2N4486, 2N4487, 2N4488, 2N4489, 2N4490, 2N4491, 2N4492, 2N4493, 2N4494, 2N4495, 2N4496, 2N4497, 2N4498, 2N4499, 2N4500, 2N4501, 2N4502, 2N4503, 2N4504, 2N4505, 2N4506, 2N4507, 2N4508, 2N4509, 2N4510, 2N4511, 2N4512, 2N4513, 2N4514, 2N4515, 2N4516, 2N4517, 2N4518, 2N4519, 2N4520, 2N4521, 2N4522, 2N4523, 2N4524, 2N4525, 2N4526, 2N4527, 2N4528, 2N4529, 2N4530, 2N4531, 2N4532, 2N4533, 2N4534, 2N4535, 2N4536, 2N4537, 2N4538, 2N4539, 2N4540, 2N4541, 2N4542, 2N4543, 2N4544, 2N4545, 2N4546, 2N4547, 2N4548, 2N4549, 2N4550, 2N4551, 2N4552, 2N4553, 2N4554, 2N4555, 2N4556, 2N4557, 2N4558, 2N4559, 2N4560, 2N4561, 2N4562, 2N4563, 2N4564, 2N4565, 2N4566, 2N4567, 2N4568, 2N4569, 2N4570, 2N4571, 2N4572, 2N4573, 2N4574, 2N4575, 2N4576, 2N4577, 2N4578, 2N4579, 2N4580, 2N4581, 2N4582, 2N4583, 2N4584, 2N4585, 2N4586, 2N4587, 2N4588, 2N4589, 2N4590, 2N4591, 2N4592, 2N4593, 2N4594, 2N4595, 2N4596, 2N4597, 2N4598, 2N4599, 2N4600, 2N4601, 2N4602, 2N4603, 2N4604, 2N4605, 2N4606, 2N4607, 2N4608, 2N4609, 2N4610, 2N4611, 2N4612, 2N4613, 2N4614, 2N4615, 2N4616, 2N4617, 2N4618, 2N4619, 2N4620, 2N4621, 2N4622, 2N4623, 2N4624, 2N4625, 2N4626, 2N4627, 2N4628, 2N4629, 2N4630, 2N4631, 2N4632, 2N4633, 2N4634, 2N4635, 2N4636, 2N4637, 2N4638, 2N4639, 2N4640, 2N4641, 2N4642, 2N4643, 2N4644, 2N4645, 2N4646, 2N4647, 2N4648, 2N4649, 2N4650, 2N4651, 2N4652, 2N4653, 2N4654, 2N4655, 2N4656, 2N4657, 2N4658, 2N4659, 2N4660, 2N4661, 2N4662, 2N4663, 2N4664, 2N4665, 2N4666, 2N4667, 2N4668, 2N4669, 2N4670, 2N4671, 2N4672, 2N4673, 2N4674, 2N4675, 2N4676, 2N4677, 2N4678, 2N4679, 2N4680, 2N4681, 2N4682, 2N4683, 2N4684, 2N4685, 2N4686, 2N4687, 2N4688, 2N4689, 2N4690, 2N4691, 2N4692, 2N4693, 2N4694, 2N4695, 2N4696, 2N4697, 2N4698, 2N4699, 2N4700, 2N4701, 2N4702, 2N4703, 2N4704, 2N4705, 2N4706, 2N4707, 2N4708, 2N4709, 2N4710, 2N4711, 2N4712, 2N4713, 2N4714, 2N4715, 2N4716, 2N4717, 2N4718, 2N4719, 2N4720, 2N4721, 2N4722, 2N4723, 2N4724, 2N4725, 2N4726, 2N4727, 2N4728, 2N4729, 2N4730, 2N4731, 2N4732, 2N4733, 2N4734, 2N4735, 2N4736, 2N4737, 2N4738, 2N4739, 2N4740, 2N4741, 2N4742, 2N4743, 2N4744, 2N4745, 2N4746, 2N4747, 2N4748, 2N4749, 2N4750, 2N4751, 2N4752, 2N4753, 2N4754, 2N4755, 2N4756, 2N4757, 2N4758, 2N4759, 2N4760, 2N4761, 2N4762, 2N4763, 2N4764, 2N4765, 2N4766, 2N4767, 2N4768, 2N4769, 2N4770, 2N4771, 2N4772, 2N4773, 2N4774, 2N4775, 2N4776, 2N4777, 2N4778, 2N4779, 2N4780, 2N4781, 2N4782, 2N4783, 2N4784, 2N4785, 2N4786, 2N4787, 2N4788, 2N4789, 2N4790, 2N4791, 2N4792, 2N4793, 2N4794, 2N4795, 2N4796, 2N4797, 2N4798, 2N4799, 2N4800, 2N4801, 2N4802, 2N4803, 2N4804, 2N4805, 2N4806, 2N4807, 2N4808, 2N4809, 2N4810, 2N4811, 2N4812, 2N4813, 2N4814, 2N4815, 2N4816, 2N4817, 2N4818, 2N4819, 2N4820, 2N4821, 2N4822, 2N4823, 2N4824, 2N4825, 2N4826, 2N4827, 2

Vertical Output Stage

The vertical pulses that come from pin 43 of IC181 are amplified by IC577 and given deflection coils via EM576 (A)

TA8403 (LA7830) (IC577)

MAXIMUM RATINGS (TA=25°C)

ITEM	SYMBOL	RATING	UNIT
Power Supply Voltage	V _{CC}	30	V
Vertical Output Supply Voltage	V _{vt}	60	V
Power Dissipation	P _D	15	W
Operating Temperature	T _{opr}	-20 to 85	°C
Storage Temperature	T _{stg}	-55 to 150	°C

TENTATIVE VERTICAL DEFLECTION OUTPUT CIRCUIT FOR COLOR TELEVISION FEATURES

- High output current
- Low power consumption provided by pump-up circuit
- Small number of external components required

RECOMMENDED OPERATING CONDITIONS (TA=25°C)

ITEM	SYMBOL	MEASURING CONDITIONS	MINI MUM	TYPICAL	MAXI MUM	UNIT
Power Supply Voltage	V _{CC}		—	24	27	V
Deflection Output Current	12p-p	Peak to peak	—	—	1.8	Ap-p

ELECTRICAL CHARACTERISTICS (TA=25°C)

ITEM	SYMBOL	MEASURING CONDITIONS	MINI MUM	TYPICAL	MAXI MUM	UNIT
Output Transistor Saturation Voltage	V _v (sat)1.	V _{CC} = 24V	0.3	0.5	1.0	V
	V _v (sat)2.	V _{CC} = 24V	1.0	1.8	3.6	V
Pump-up Output Tr. Saturation Voltage	V _p (sat)1.	V _{CC} = 24V	1.0	2.0	3.0	V
	V _p (sat)2.	V _{CC} = 24V	0.3	0.8	1.6	V
Quiescent Current	I _B	V _{CC} = 24V	10.0	15.0	30.0	mA
Center Voltage	V _{center}	V _{CC} = 24V	10.0	12.0	14.0	V

1. GND
2. Vertical Output
3. Vertical Output Power Supply
4. Input
5. Phase Compensation
6. Supply Voltage
7. Pump-up Output

EQUIVALENT BLOCK DIAGRAM AND PIN CONFIGURATION

BUH515D (2SD1555) (Q580)

CRT HORIZONTAL DEFLECTION HIGH VOLTAGE NPN FASTSWITCHING TRANSISTOR

- High breakdown voltage capability
- Fully insulated package for easy mounting
- Low saturation voltage
- High switching speed
- Complete characterization of power losses and switching times as a function of negative base current for optimum drive

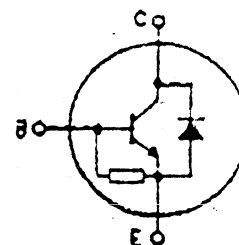
APPLICATIONS:

- Horizontal deflection stage in standard and high resolution dis-plays for TV's and monitors



ISOWATT218

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CS0}	Collector-Base Voltage ($I_E = 0$)	1500	V
V_{CE0}	Collector-Emitter Voltage ($I_B = 0$)	700	V
V_{E90}	Emitter-Base Voltage ($I_C = 0$)	5	V
I_C	Collector Current	8	A
I_{CM}	Collector Peak Current ($t_p < 5$ ms)	15	A
I_B	Base Current	5	A
I_{BM}	Base Peak Current ($t_p < 5$ ms)	8	A
P_{tot}	Total Dissipation at $T_c = 25^\circ\text{C}$	80	W
T_{ztg}	Storage Temperature	-65 to 150	$^\circ\text{C}$
T_1	Max. Operating Junction Temperature	150	$^\circ\text{C}$

BUH515

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-case	Max	2.08	$^{\circ}C/W$
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ELECTRICAL CHARACTERISTICS (T_{case} = 25 $^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current ($V_{BE} = 0$)	$V_{CE} = 1500 V$ $V_{CE} = 1500 V$ $T_j = 125^{\circ}C$			1 2	mA mA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 5 V$			100	μA
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage	$I_C = 100 mA$	700			V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	$I_E = 10 mA$	10			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 5 A$ $I_B = 1.25 A$			1.5	V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 5 A$ $I_B = 1.25 A$			1.3	V
h_{FE}^*	DC Current Gain	$I_C = 5 A$ $V_{CE} = 5 V$ $I_C = 5 A$ $V_{CE} = 5 V$ $T_j = 100^{\circ}C$	6 4			
t_s t_f	RESISTIVE LOAD Storage Time Fall Time	$V_{CC} = 400 V$ $I_C = 5 A$ $I_{B1} = 1.25 A$ $I_{B2} = 2.5 A$		2.7 190	3.9 280	μs ns
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	$I_C = 5 A$ $f = 15625 Hz$ $I_{B1} = 1.25 A$ $I_{B2} = 2.5 A$ $V_{ceflyback} = 1050 \sin \left\{ \frac{\pi}{10} 10^6 \right\} t V$		2.3 3.50		μs ns
t_s t_f	INDUCTIVE LOAD Storage time Fall Time	$I_C = 5 A$ $F = 31250 Hz$ $I_{B1} = 1.25 A$ $I_{B2} = 2.5 A$ $V_{ceflyback} = 1200 \sin \left\{ \frac{\pi}{5} 10^6 \right\} t V$		2.3 200		μs ns

* Pulsed: Pulse duration = 300 μs , duty cycle 1.5%

CRT CIRCUIT

VRSI-VR92
 VRSI-VR99
 VRSI-VR97
 VRSI-VR97
 VRSI-VR97
 VRSI-VR95
 VRSI-VR95



BF 869 . BF 871 (Q51, Q52, Q53)

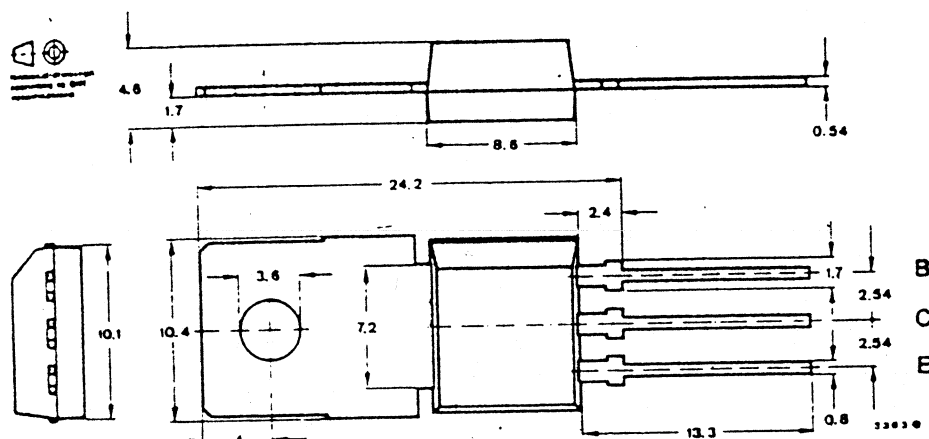
Silicon NPN Epitaxial Planar RF Transistors

Applications: Video-B-class power stages in TV-receivers

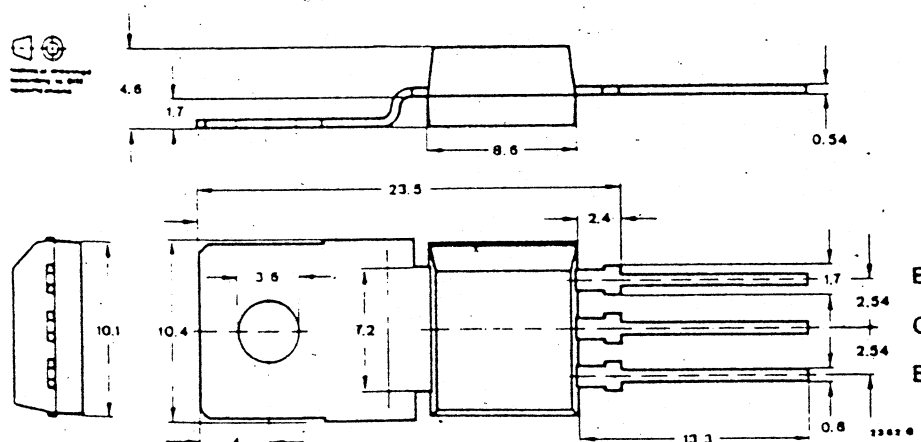
FEATURES:

- High reverse voltage
- BF 869 complementary to BF 870
- BF 871 complementary to BF 872

Dimensions in mm



BF 869 . BF 871

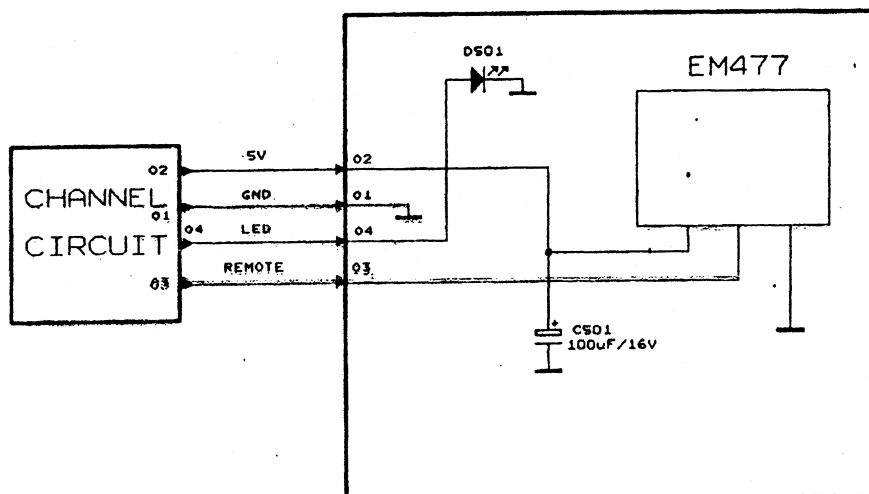


Collector connected
with metallic surface

Case
34 A 3 DIN 41 869
JEDEC TO 202
Weight max. 1.8 g

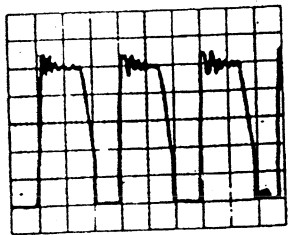
Absolute maximum ratings		BF 869	BF 871	
Collector-base voltage	V_{CBO}	250	300	V
Collector-emitter voltage	V_{CEO}	250		V
$R_{BE} \leq 2.7 \text{ k}\Omega$	V_{CER}		300	V
Emitter-base voltage	V_{EBO}	5		V
Collector current	I_C	50		mA
Collector peak current	I_{CM}	100		mA
Total power dissipation $T_{case} \leq 25^\circ\text{C}$	P_{tot}	5		W
Junction temperature	T_j	150		$^\circ\text{C}$
Storage temperature range	T_{stg}	-65...+150		$^\circ\text{C}$
Thermal resistances		Min.	Typ.	Max.
Junction ambient	R_{thJA}			85 K/W
Junction case	R_{thJC}			25 K/W
Characteristics $T_{amb} = 25^\circ\text{C}$, unless otherwise specified				
Collector cut-off current $V_{CB}=200\text{V}$	I_{CBO}		100	nA
$V_{CB}=250\text{V}$, $R_{BE}=2.7 \text{ k}\Omega$	I_{CER}		50	nA
$V_{CE}=200\text{V}$, $R_{BE}=2.7 \text{ k}\Omega$, $T_j = 150^\circ\text{C}$	I_{CER}		10	μA
Emitter cut-off current $V_{EB} = 5\text{V}$	I_{EBO}		10	μA
Collector-emitter breakdown voltage $I_C = 1 \text{ mA}$	$V_{(BR)CEO}$	250		V
$I_C = 1 \mu\text{A}$, $R_{BE} = 2.7 \text{ k}\Omega$	$V_{(BR)CER}$	300		V
DC forward current transfer ratio $V_{CE} = 20 \text{ V}$, $I_C = 25 \text{ mA}$	h_{FE}	50		
Gain bandwidth product $V_{CB} = 10 \text{ V}$, $I_C = 10 \text{ mA}$	f_T	60		MHz
Feedback capacitance $V_{CB} = 30 \text{ V}$, $I_C = 0$, $f = 1 \text{ MHz}$	$C_{üre}$		1.8	pF
Collector saturation RF voltage $I_C = 25 \text{ mA}$, $T_j = 150^\circ\text{C}$	$V_{CEsatHF}$	20		V

REMOTE SENSOR CIRCUIT



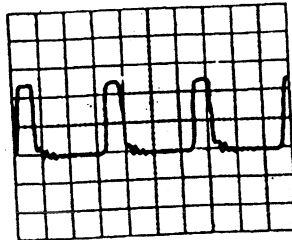
OSCILLOSCOPE SIGNALS

1) 5 usn/div 100 volt/div



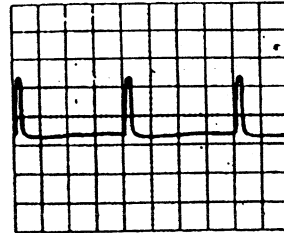
Collector of Q101

2) 20 usn/div 2volt/div



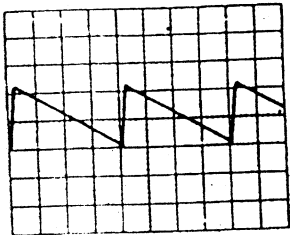
IC-476 pin 26

3) 5m sn/div 2volt/div



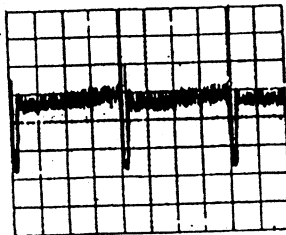
IC-476 pin 27

4) 5 msn/div 0,5 volt/div



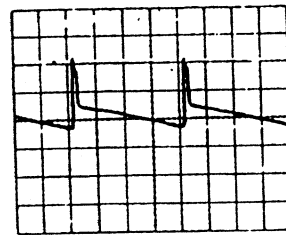
IC-181 pin 41

5) 5 msn/div 1 volt/div



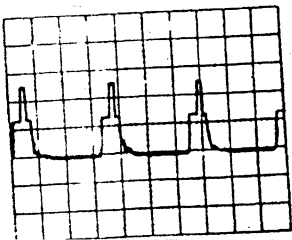
IC-577 pin 4

6) 5 msn/div 20 volt/div



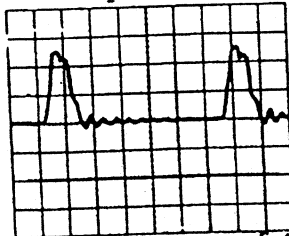
IC-577 pin 2

7) 20 usn/div 2 volt/div



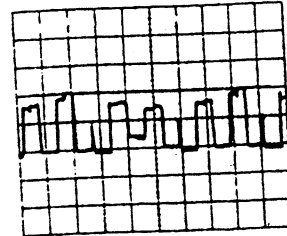
IC-181 pin 38

8) 10 usn/div 50 volt/div



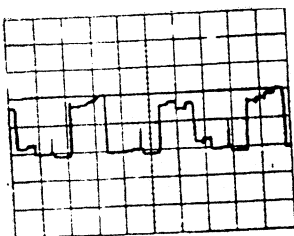
Cathode of D 584

9) 20 usn/div 2 volt/div



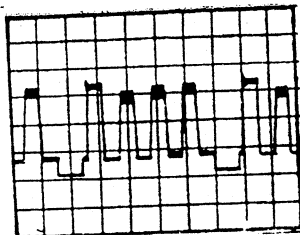
IC-181 pin 20

10) 20 usn/div 2 volt/div



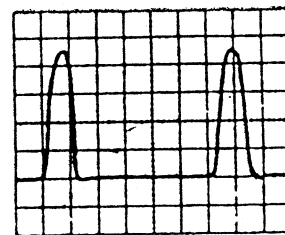
IC-181 pin 19

11) 10 usn/div 2 volt/div



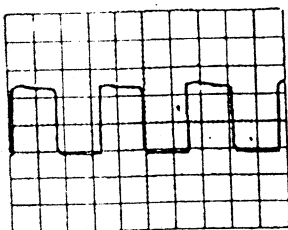
IC-181 pin 18

12) 10 usn/div 200 volt/div



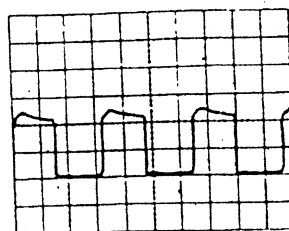
Collector of Q 580

13) 20 usn/div 0.5 volt/div



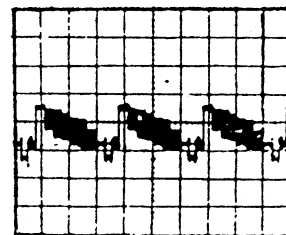
IC-181 pin 37

14) 20 usn/div 50 volt/div



Collector of Q 581

15) 20 usn/div 1 volt/div



IC-181 pin 13

PIN VOLTAGES OF IC'S

Pin.	TDA8361	ST63T85	TDA4661	TDA1905	TA8403	TDA4605	LM317
1	2.9V	3.9V (Varicap)	5.1V	10.2V	0V	0.4V	10.7V
2	5.8V	0.25V	0V	19.7V	14.6V	1.18V	11.9V
3	5.8V	4.8V	0V	18.27V	25.2V	2.9V	16.9V
4	6.9V	2.3V	0V	1.8V	0.9V	0V	
5	0.5V	2.2V	0.4V	0V	0.8V	3V	
6	3.8V	5V	3.3V	3.8V	25V	13.1V	
7	3V	5V	1V	3.8V	1.35V	1.9V	
8	1.8V	5V	0V	3.7V		0.4V	
9	0V	2.8V(AFT)	5.1V	0V			
10	8V	5V	0V	0V			
11	0V	5V	2.8V	0V			
12	2.8V	5V	2.8V	0V			
13	4V	5V	0V	0V			
14	2.9V	5V	1.2V	0V			
15	3.4V	5V	0V	0V			
16	0V	0V	1.2V	0V			
17	2.5V	5V					
18	1.8V	0V					
19	1.8V	4.5V					
20	2.4V	4.3V					
21	0.2V	0V					
22	3.2V	0V					
23	3.3V	0V					
24	3.3V	0V					
25	2.5V	0V					
26	1.8V	0.6V					
27	5.2V	0.1V					
28	3.8V	5V					
29	3.9V	5V					
30	1.5V	0V					
31	1.4V	1.9V					
32	0.03V	2.6V					
33	4.7V	4.8V					
34	2.5V	0V					
35	2V	5V					
36	7.9V	0.5V					
37	0.4V	0V					
38	0.4V	5V					
39	3.3V	5V					
40	3.7V	5V					
41	2.3V	4.7V					
42	2.8V	5V					
43	0.9V						
44	4.3V						
45	4V						
46	4V						
47	6.5V						
48	3.6V						
49	0.9V						
50	3.4V						
51	4.3V						
52	6.5V						

- * All voltages are in Volt
- * Reading are taken with a digital multimeter.
- * Reading are taken with a colour-bar signal input.

* Sound Contrast Brightness Color } min. Normal

**CHASSIS
REPLACEMENT
PARTS LIST**

POS:	COMPONENT:	DESCRIPTION:
BK01	BATTERY	NiCd 3/V 100R 3.6 V 110 mAh
C101	CAP. M. POLYPROPYLENE	0.10 μ f 10% 275 VAC
C102	CAP. M. POLYPROPYLENE	0.10 μ f 10% 275 VAC
C103	CAP. CERAMIC	1000 pf 10% 1 KV BN
C104	CAP. CERAMIC	1000 pf 10% 1 KV BN
C105	CAP. AL.ELECT.	100 μ f 20% 400 V SR
C106	CAP. POLYESTER	0.033 μ f 5% 630 V GP
C107	CAP. CERAMIC	1000 pf 10% 2 KV BN
C108	CAP. CERAMIC	100 pf 10% 50 V SL
C109	CAP. ELECT.	1 μ f 20% 50 V GP
C110	CAP. POLYESTER	0.0033 μ f 10% 50 V
C111	CAP. POLYESTER	0.0068 μ f 20% 50 V
C112	CAP. ELECT.	47 μ f 20% 16 V GP
C113	CAP. M. POLYESTER	0.22 μ f 5% 50 V GP
C114	CAP. CERAMIC	100 pf 20% 1 KV BN
C115	CAP. CERAMIC SAFETY	2200 pf 10% 4 KV MX
C116	CAP. CERAMIC	470 pf 10% 1 KV BN
C117	CAP. ELECT.	1000 μ f 20% 25V GP
C118	CAP. CERAMIC	470 pf 10% 1 KV BN
C119	CAP. ELECT.	47 μ f 20% 160 V GP
C120	CAP. ELECT.	1000 μ f 20% 16 V GP
C121	CAP. ELECT.	220 μ f 20% 16 V GP
C123	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C124	CAP. ELECT.	47 μ f 20% 16 V GP
C125	CAP. ELECT.	2.2 μ f 20% 50 V GP
C126	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C128	CAP. ELECT.	220 μ f 20% 16 V GP
C129	CAP. CERAMIC	470 pf 10% 1 KV BN
C130	CAP. ELECT.	2200 μ f 20% 25 V GP
C131	CAP. ELECT.	220 μ f 20% 16 V GP
C132	CAP. M. POLYESTER	0.1 μ f 5% 50 V GP
C133	CAP. M. POLYESTER	0.1 μ f 5% 50 V GP
C134	CAP. ELECT.	4.7 μ f 20% 50 V
C135	CAP. CERAMIC	470 pf 10% 1 KV BN
C151	CAP. CERAMIC	1 nf +80-20% 50 V F
C152	CAP. CERAMIC	1 nf +80-20% 50 V F
C153	CAP. CERAMIC	1 nf +80-20% 50 V F
C154	CAP. CERAMIC	1 nf +80-20% 50 V F
C161	CAP. ELECT.	470 μ f 20% 16 V GP
C162	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C163	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C164	CAP. ELECT.	10 μ f 20% 16 V GP
C165	CAP. ELECT.	33 μ f 20% 16 V GP
C166	CAP. ELECT.	10 μ f 20% 16 V GP
C167	CAP. M. POLYESTER	330 nf 5% V GP
C169	CAP. ELECT.	10 μ f 20% 16 V GP
C181	CAP. CERAMIC	4700 pf 10% 50 V B
C182	CAP. CERAMIC	10 pf 5% 50 V CH
C183	CAP. ELECT.	10 μ f 20% 16 V GP
C184	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C185	CAP. ELECT.	220 μ f 20% 16 V GP
C186	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C187	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C188	CAP. POLYESTER	0.047 μ f 5% 50 V
C189	CAP. ELECT.	10 μ f 20% 16 V GP
C190	CAP. M. POLYESTER	0.1 μ f 5% 50 V GP
C191	CAP. ELECT.	10 μ f 20% 16 V GP
C192	CAP. CERAMIC	100 nf +80-20% 25 V FZ

POS:	COMPONENT:	DESCRIPTION:
C193	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C194	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C195	CAP. ELECT.	10 µf 20% 16 V GP
C196	CAP. ELECT.	10 µf 20% 16 V GP
C197	CAP. CERAMIC	100 nf+80-20% 25 V FZ
C198	CAP. POLYESTER	0.0047µf 10% 50 V
C200	CAP. CERAMIC	18 pf 5% 50 V CH
C201	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C202	CAP. ELECT.	10 µf 20% 16 V GP
C203	CAP. POLYESTER	0.0022µf 10% 50 V
C204	CAP. POLYESTER	0.0047 µf 10% 50 V
C205	CAP. ELECT.	1 µf 20% 50 V GP
C206	CAP. CERAMIC	22 nf +80-20% 50 V (FZ)
C207	CAP. M. POLYESTER	0.1 µf 5% 63 V GP
C208	CAP. POLYESTER	0.022 µf 5% 50 V GP
C209	CAP. CERAMIC	22 nf +80-20% 50 V (FZ)
C210	CAP. ELECT	2.2 µf 20% 50 V GP
C211	CAP. POLYESTER	0.022 µf 5% 50 V GP
C212	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C213	CAP. ELECT.	10 µf 20% 16 V GP
C124	CAP. ELECT.	2.2 µf 20% 50 V GP
C125	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C216	CAP. ELECT.	10 µf 20% 16 V GP
C241	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C242	CAP. ELECT.	100 µf 20% 16 V GP
C243	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C244	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C245	CAP. CERAMIC	1 nf +80-20% 50 V F
C246	CAP. CERAMIC	1 nf +80-20% 50 V F
C251	CAP. ELECT.	100 µf 20% 16 V GP
C252	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C253	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C254	CAP. M. POLYESTER	0.22 µf 5% 50 V GP
C26	CAP. CERAMIC	15 pf 5% 50 V CH
C27	CAP. CERAMIC	5 pf 5% 50 V CH
C28	CAP. CERAMIC	5 pf 5% 50 V CH
C29	CAP. CERAMIC	12 pf 5% 50 V CH
C30	CAP. CERAMIC	1 nf +80-20% 50 V F
C31	CAP. CERAMIC	100 pf 10% 50 V SL
C326	CAP. CERAMIC	33 pf 10% 50 V B
C327	CAP. CERAMIC	33 pf 10% 50 V B
C328	CAP. CERAMIC	47 pf 10% 50 V SL
C329	CAP. ELECT	1 µf 20% 50 V GP
C351	CAP. CERAMIC	1 nf +80-20% 50 V F
C352	CAP. CERAMIC	1 nf S +80-20% 50 V F
C353	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C355	CAP. CERAMIC	100 nf +80-20% 25 V FZ
C356	CAP. ELECT.	4.7 µf 20% 16 V
C357	CAP. ELECT.	4.7 µf 20% 16 V
C358	CAP. CERAMIC	220 nf 10% 50 V
C359	CAP. CERAMIC	220 nf 10% 50 V
C360	CAP. CERAMIC	220 nf 10% 50 V
C361	CAP. CERAMIC	10 nf +80-20% 50 V (FZ)
C362	CAP. ELECT.	10 µf 20% 16 V GP
C363	CAP. CERAMIC	220 nf 10% 50 V
C364	CAP. CERAMIC	220 nf 10% 50 V
C401	CAP. M. POLYESTER	0.1 µf 5% 50 V GP
C401C	CAP. M. POLYESTER	0.1 µf 5% 63 V GP

POS:	COMPONENT:	DESCRIPTION:
C402	CAP. ELECT.	.1000 μ f 20% 25V GP
C402C	CAP. CERAMIC	.22 pf 10% 50 V CH
C403	CAP. ELECT.	.1000 μ f 20% 25 V GP
C403C	CAP. ELECT.	.4.7 μ f 20% 50 V
C404	CAP. CERAMIC	.100 nf +80-20% 25 V FZ
C405	CAP. ELECT.	.47 μ f 20% 16 V GP
C407	CAP. CERAMIC	.2.2 nf +80-20% 50 V (FZ)
C408	CAP. ELECT.	.2.2 μ f 20% 50 V GP
C409	CAP. ELECT.	.10 μ f 20% 16 V GP
C410	CAP. M. POLYESTER	.0.1 μ f 5% 50 V GP
C476	CAP. CERAMIC	.22 nf +80-20% 50 V (FZ)
C477	CAP. M. POLYESTER	.330 nf 5% 50 V GP
C478	CAP. ELECT.	.2.2 μ f 20% 50 V GP
C479	CAP. ELECT.	.2.2 μ f 20% 50 V GP
C480	CAP. ELECT.	.2.2 μ f 20% 50 V GP
C481	CAP. ELECT.	.2.2 μ f 20% 50 V GP
C483	CAP. CERAMIC	.22 pf 10% 50 V CH
C484	CAP. CERAMIC	.22 pf 10% 50 V CH
C485	CAP. CERAMIC	.22 pf 10% 50 V CH
C486	CAP. CERAMIC	.22 pf 10% 50 V CH
C487	CAP. POLYESTER	.0.015 μ f 10% 50 V
C488	CAP. M. POLYESTER	.0.1 μ f 5% 50 V GP
C489	CAP. CERAMIC	.47 pf 10% 50 V CH
C490	CAP. CERAMIC	.47 pf 10% 50 V CH
C491	CAP. CERAMIC	.33 pf 10% 50 V CH
C492	CAP. CERAMIC	.33 pf 10% 50 V CH
C493	CAP. ELECT.	.1 μ f 20% 50 V GP
C494	CAP. ELECT.	.220 μ f 20% 16 V GP
C495	CAP. CERAMIC	.22 nf +80-20% 50 V (FZ)
C496	CAP. POLYESTER	.0.022 μ f 5% 50 V GP
C497	CAP. ELECT.	.470 μ f 20% 16 V GP
C51	CAP. CERAMIC	.220 pf 5% 50 V B
C52	CAP. CERAMIC	.220 pf 5% 50 V B
C53	CAP. CERAMIC	.560 pf 10% 50 V B
C54	CAP. ELECT.	.470 μ f 20% 16 V GP
C55	CAP. ELECT.	.10 μ f 20% 250 V
C56	CAP. ELECT.	.2.2 μ f 20% 250 V
C57	CAP. CERAMIC	.1000 pf 10% 2 KV BN
C576	CAP. CERAMIC	.100 pf 10% 500 V B
C577	CAP. CERAMIC	.1 nf +80-20% 50 V F
C578	CAP. CERAMIC	.22 nf +80-20% 50V (FZ)
C579	CAP. ELECT.	.1000 μ f 20% 35 V GP
C58	CAP. CERAMIC	.4700 pf +50-20% 2 KV BN
C580	CAP. ELECT.	.100 μ f 20% 35 V GP
C581	CAP. ELECT.	.1 μ f 20% 50 V GP
C582	CAP. ELECT.	.1000 μ f 20% 16 V GP
C583	CAP. M. POLYESTER	.0.1 μ f 5% 50 V GP
C587	CAP. CERAMIC	.470 pf 10% 2 KV BN
C590	CAP. ELECT.	.1 μ f 20% 250 V GP
C592	CAP. CERAMIC	.680 pf 10% 1 KV BN
C593	CAP. ELECT.	.1 μ f 20% 250 V GP
C596	CAP. POLYPROPYLENE	.0.0072 μ f 2.5% 1600V
C597	CAP. CERAMIC	.1000 pf 10% 2 KV BN
C598	CAP. ELECT.	.4.7 μ f 20% 50 V
C599	CAP. ELECT.	.1 μ f 20% 50 V GP
C600	CAP. CERAMIC	.220 pf 10% 500 V B
C611	CAP. ELECT.	.47 μ f 20% 160 V GP
C670	CAP. ELECT.	.22 μ f 20% 16 V GP

POS:	COMPONENT:	DESCRIPTION:
C671	CAP. CERAMIC	.1 nf 10% 50 V SL
C676	CAP. CERAMIC	.100 nf +80-20% 25 V FZ
C687	CAP. CERAMIC	.22 pf 10% 50 V SL
C690	CAP. CERAMIC	.22 pf 10% 50 V SL
C692	CAP. CERAMIC	.22 pf 10% 50 V CH
C695	CAP. CERAMIC	.22 pf 10% 50 V CH
C696	CAP. CERAMIC	.22 pf 10% 50 V CH
C698	CAP. CERAMIC	.22 pf 10% 50 V CH
C728	CAP. CERAMIC	.15 pf 5% 50 V CH
C729	CAP. CERAMIC	.1 nf +80-20% 50 V F
C730	CAP. CERAMIC	.470 pf %10 50 V (SL)
C731	CAP. CERAMIC	.20 nf +80-20% 50 V (FZ)
C732	CAP. CERAMIC	.470 pf %10 50 V (SL)
C734	CAP. CERAMIC	.15 pf 5% 50 V CH
C735	CAP. CERAMIC	.27 pf 10% 50 V CH
C736	CAP. CERAMIC	.10 nf +80-20% 50 V (FZ)
C737	CAP. POLYESTER	.0047 μ f 5% 50 V
C738	CAP. CERAMIC	.100 nf +80-20% 25 V FZ
C739	CAP. CERAMIC	.18 pf 5% 50 V CH
C740	CAP. POLYESTER	.0047 μ f 5% 50 V
C741	CAP. ELECT.	.10 μ f 20% 16 V GP
C742	CAP. CERAMIC	.220 pf 10% 50 V SL
C743	CAP. POLYESTER	.0068 μ f 5% 50 V
C744	CAP. ELECT.	.22 μ f 20% 50 V GP
C747	CAP. ELECT.	.100 μ f 20% 16 V GP
C748	CAP. CERAMIC	.22 nf +80-20% 50 V (FZ)
C749	CAP. CERAMIC	.10 nf +80-20% 50 V (FZ)
C750	CAP. CERAMIC	.10 nf +80-20% 50 V (FZ)
C751	CAP. ELECT.	.100 μ f 20% 16 V GP
C752	CAP. CERAMIC	.22 nf +80-20% 50 V (FZ)
C760	CAP. ELECT.	.10 μ f 20% 16 V GP
C761	CAP. ELECT.	.10 μ f 20% 16 V GP
C762	CAP. ELECT.	.10 μ f 20% 16 V GP
CDX	CAP. CERAMIC	.2200 pf 10% 2 KV BN
D101	DIODE	.1N4007
D102	DIODE	.1N4007
D103	DIODE	.1N4007
D104	DIODE	.1N4007
D105	DIODE	.BYD 33D
D106	DIODE	.BYV 95C
D107	DIODE, ZENER	.6.2 V
D108	DIODE	.BYD 33D
D109	DIODE	.BYD 33D
D111	DIODE	.BYV 95C
D112	DIODE	.BYV 95C
D113	DIODE	.BYV 95C
D114	DIODE, TEMP. COMP. ZENER	.UPC574J
D115	DIODE	.BYD 33D
D161	DIODE	.1N4148
D162	DIODE	.1N4148
D163	DIODE	.1N4148
D164	DIODE	.1N4148
D165	DIODE	.1N4148
D166	DIODE	.1N4148
D167	DIODE	.1N4148
D169	DIODE	.1N4148
D170	DIODE	.1N4148

POS:	COMPONENT:	DESCRIPTION:
D171	DIODE	1N4148
D181	DIODE	1N4148
D187	DIODE	1N4148
D241	DIODE, ZENER	5.1 V 0.5 W 5%
D351	DIODE	BB809
D352	DIODE	1N4148
D353	DIODE	BA282 / BA582 / BA482
D354	DIODE	BA282 / BA582 / BA482
D355	DIODE	1N4148
D356	DIODE	1N4148
D357	DIODE	1N4148
D476	DIODE	1N4148
D477	DIODE	1N4148
D478	DIODE	1N4148
D479	DIODE	1N4148
D480	DIODE	1N4148
D481	DIODE	1N4148
D482	DIODE	1N4148
D483C	DIODE, ZENER	7.5 V 0.5 W 5%
D484	DIODE	1N4148
D485	DIODE	1N4148
D486	DIODE	1N4148
D487	DIODE	1N4148
D488	DIODE	1N4148
D489	DIODE	1N4148
D490	DIODE	1N4148
D491	DIODE, ZENER	3.9 V 0.5 W 5%
D500	DIODE	1N4148
D51	DIODE, RECTIFIER	1N4007
D578	DIODE	BYD 33D
D582	DIODE	BYV 95C
D583	DIODE	BYV 95C
D584	DIODE, ZENER	9.1V 0.5 W 5%
D585	DIODE	BYV 95C
D727	DIODE	1N4148
D729	DIODE	1N4148
D730	DIODE	1N4148
D731	DIODE	1N4148
D732	DIODE	1N4148
D733	DIODE	1N4148
D734	DIODE	1N4148
D735	DIODE	1N4148
E102	HARNESS ASS'Y 2P 1 CNN	BROWN/BLUE (MAINS) 70 CM H4
E102	CONNECTOR 2P	5285-02A (MAINS)
E108	CONNECTOR 2P	5287-02A (DEGAUSS.)
E108	HARNESS ASS'Y 2P 1 CNN	BLACK/WHITE (DEGAUSS.) 35 CM h2
EM101	CORD POWER	KP-419 LTCE-2F (0.75) SQM/3M
EM101*	CORD POWER	LTBS 0.75 SQM 3M W.PLUG (BSI)
EM103	FUSE, SLOW	3.15 A / 250 V
EM104	FILTER, LINE	ELF-18D615
EM107	POSISTOR	PTH451A102BG180M290
EM111	TRANSFORMER	SMPS 110V (FOR 14" CTV)
EM113	COIL	FILTER 3.5X10X1.3 H
EM151	TUNER	TECU5983VA06A
EM151	TUNER	SAMSUNG TUNER
EM182	CRYSTAL, QUARTZ	4.433619 MHz
EM401C	CRYSTAL	32.768 KHZ

POS:.....	COMPONENT:	DESCRIPTION:
EM476	CRYSTAL	8.00 MHz
EM575	CONNECTOR 2P	5283-02A (HORZ.)
EM575	HARNESS ASS'Y 2P 1 CNN	RED/WHITE (HOR.) 40 CM h3
EM576	CONNECTOR 2P	5279-02A (VERT.)
EM576	HARNESS ASS'Y 2P 1 CNN	BROWN/BLACK (VER.) 40 CM h1
EM577	TRANSFORMER	HORIZONTAL DRIVE
EM579	COIL	FILTER 3.5x10x1.3 H
EM580	TRANSFORMER	FLYBACK
EM726	CRYSTAL	13.875 MHz
EM727	RESONATOR, CERAMIC	6 MHz
FI181	FILTER, CERAMIC TRAP	5.5 MHz TPS 5.5 MB
FI182	FILTER, CERAMIC TRAP	6.5 MHz TPS 6.5 MB
FI182	FILTER, CERAMIC TRAP	6 MHz TPS 6 MB
FI183	FILTER, SAW	J1951 M
FI183	FILTER, SAW	SAF 38.9 MS51P K2950
FI183	FILTER, SAW	K3953
FI326	FILTER, CERAMIC	5.5 MHz SFE 5.5 MB
FI326	FILTER, CERAMIC	6 MHz SFE 6 MB
FI327	FILTER, CERAMIC	6.5 MHz SFE 6.5 MB
FI351	FILTER, SAW	L9453
IC101	IC	LM317
IC102	IC	L7808 8V 1A
IC103	IC	L7805 5V 1A
IC104	IC	TDA 4605
IC181	IC	TDA 8362
IC181	IC	TDA 8361
IC241	IC	TDA 4661
IC251	IC	TDA 8395
IC351	IC	TDA 9830
IC401	IC	TDA 1905
IC401C	IC	M 8716BB1
IC476	IC	ST 6385
IC577	IC	TDA 8403K
IC728	IC	SAA5345 P/T
IC730	IC	SAA5231
L101	COIL, CHOKE	150 UH
L151	COIL, AXIAL FIXED	1 UH J
L152	COIL, AXIAL FIXED	10 UH
L181	COIL, AXIAL FIXED	6.8 UH J
L182	COIL, AXIAL FIXED	10 UH
L326	COIL, AXIAL FIXED	8.2 UH J
L351	COIL, AXIAL FIXED	1 UH J
L476	COIL, AXIAL FIXED	47 UH J
L51	COIL, AXIAL FIXED	150 UH J
L576	COIL	50 UH LINEARITY
L676	COIL, AXIAL FIXED	8.2 UH J
L678	COIL, AXIAL FIXED	8.2 UH J
L680	COIL, AXIAL FIXED	8.2 UH J
L681	COIL, AXIAL FIXED	8.2 UH J
L726	COIL, AXIAL FIXED	15 UH
Q101	TRANSISTOR	H3N90
Q102	TRANSISTOR	JC 547 A
Q151	TRANSISTOR	BF 370
Q161	TRANSISTOR	JC 558
Q162	TRANSISTOR	JC 558
Q163	TRANSISTOR	JC 558
Q181	TRANSISTOR	JC 547 A
Q257	TRANSISTOR	JC 547 A

POS:.....	COMPONENT:	DESCRIPTION:
Q351	TRANSISTOR	JC 547 A
Q352	TRANSISTOR	JC 547 A
Q353	TRANSISTOR	JC 547 A
Q354	TRANSISTOR	JC 547 A
Q355	TRANSISTOR	JC 547 A
Q356	TRANSISTOR	JC 547 A
Q357	TRANSISTOR	JC 547 A
Q360	TRANSISTOR	JC 547 A
Q361	TRANSISTOR	JC 547 A
Q362	TRANSISTOR	JC 547 A
Q363	TRANSISTOR	JC 547 A
Q364	TRANSISTOR	JC 547 A
Q401C	TRANSISTOR	JC 558
Q476	TRANSISTOR	PH2369
Q480	TRANSISTOR	JC 558
Q481	TRANSISTOR	JC 547 A
Q482	TRANSISTOR	JC 547 A
Q483	TRANSISTOR	JC 547 A
Q484	TRANSISTOR	JC 547 A
Q 485	TRANSISTOR	JC 547 A
Q488	TRANSISTOR	JC 558
Q498	TRANSISTOR	JC 547 A
Q499	TRANSISTOR	JC 547 A
Q51	TRANSISTOR	BF 869
Q52	TRANSISTOR	BF 869
Q53	TRANSISTOR	BF 869
Q579	TRANSISTOR	2SC1573A
Q580	TRANSISTOR	BUH315D
Q581	TRANSISTOR	JC 547 A
Q678	TRANSISTOR	JC 547 A
Q726	TRANSISTOR	JC 547 A
Q727	TRANSISTOR	JC 547 A
Q728	TRANSISTOR	JC 547 A
Q729	TRANSISTOR	JC 547 A
Q730	TRANSISTOR	JC 547 A
R101	RES. CEMENT	5.6 R %10 5 W
R102	RES. M. O. FILM	.68 K 5% 2 W
R103	RES. M. O. FILM	.68 K 5% 2 W
R104	RES. CAR. FILM	.220 R 5% 1/4 W
R106	RES. CAR. FILM	.8.2 K 5% 1/4 W
R107	RES. CAR. FILM	.47 R 5% 1/4 W
R108	RES. CAR. FILM	.220 K 5% 1/4 W
R109	RES. CAR. FILM	.330 K 5% 1/4 W
R110	RES. CAR. FILM	.3.3 K 5% 1/4 W
R111	RES. CAR. FILM	.47 R 5% 1/4 W
R112	RES. CAR. FILM	.5.1 R 5% 1/4 W
R114	RES. CAR. FILM	.10 K 5% 1/4 W
R115	RES. COAT. INSULATED	.8.2 M 5% 1 W
R127	RES. M. O. FILM	.47 K 5% 1 W
R128	RES. M. FILM FUSING	.1 R 5% 1 W
R131	RES. M. FILM FUSING	.1 R 5% 1 W
R132	RES. M. O. FILM	.12 K 5% 1 W
R133	RES. M. O. FILM	.33 R 5% 1 W
R134	RES. CAR. FILM	.3.3 K 5% 1/4 W
R135	RES. CAR. FILM	.390 R 5% 1/4 W
R136	RES. CAR. FILM	.4.7 K 5% 1/4 W
R137	RES. CAR. FILM	.47 R 5% 1/4 W
R151	RES. CAR. FILM	.150 R 5% 1/4 W

POS:.....COMPONENT: DESCRIPTION:

R152	RES. CAR. FILM	1.2 K 5% 1/4 W
R153	RES. CAR. FILM	1.2 K 5% 1/4 W
R154	RES. CAR. FILM	5.6 K 5% 1/4 W
R155	RES. CAR. FILM	10 R 5% 1/4 W
R156	RES. CAR. FILM	68 R 5% 1/4 W
R163	RES. CAR. FILM	10 K 5% 1/4 W
R164	RES. CAR. FILM	22 K 5% 1/4 W
R165	RES. CAR. FILM	1 K 5% 1/4 W
R166	RES. CAR. FILM	22 K 5% 1/4 W
R167	RES. CAR. FILM	4.7 K 5% 1/4 W
R168	RES. CAR. FILM	22 K 5% 1/4 W
R169	RES. CAR. FILM	4.7 K 5% 1/4 W
R170	RES. CAR. FILM	10 K 5% 1/4 W
R171	RES. CAR. FILM	22 K 5% 1/4 W
R172	RES. CAR. FILM	4.7 K 5% 1/4 W
R173	RES. CAR. FILM	2.7 K 5% 1/4 W
R175	RES. CAR. FILM	1 M 5% 1/4 W
R181	RES. CAR. FILM	330 R 5% 1/4 W
R182	RES. CAR. FILM	5.6 K 5% 1/4 W
R183	RES. CAR. FILM	1 K 5% 1/4 W
R184	RES. CAR. FILM	100 R 5% 1/4 W
R185	RES. CAR. FILM	180 R 5% 1/4 W
R186	RES. CAR. FILM	1 K 5% 1/4 W
R187	RES. CAR. FILM	1.5 K 5% 1/4 W
R189	RES. CAR. FILM	4.7 K 5% 1/4 W
R190	RES. CAR. FILM	8.2 K 5% 1/4 W
R191	RES. CAR. FILM	680 K 5% 1/4 W
R192	RES. CAR. FILM	12 K 5% 1/4 W
R193	RES. CAR. FILM	100 R 5% 1/4 W
R194	RES. CAR. FILM	100 R 5% 1/4 W
R195	RES. CAR. FILM	100 R 5% 1/4 W
R196	RES. CAR. FILM	100 K 5% 1/4 W
R197	RES. CAR. FILM	47 K 5% 1/4 W
R199	RES. CAR. FILM	10 R 5% 1/4 W
R200	RES. CAR. FILM	27 K 5% 1/4 W
R201	RES. CAR. FILM	470 K 5% 1/4 W
R202	RES. CAR. FILM	12 K 5% 1/4 W
R204	RES. CAR. FILM	330 K 5% 1/4 W
R205	RES. CAR. FILM	5.6 K 5% 1/4 W
R209	RES. CAR. FILM	1 M 5% 1/4 W
R210	RES. CAR. FILM	56 K 5% 1/4 W
R211	RES. CAR. FILM	2 M 5% 1/4 W
R212	RES. CAR. FILM	3.3 K 5% 1/4 W
R213	RES. CAR. FILM	10 K 5% 1/4 W
R214	RES. CAR. FILM	18 K 5% 1/4 W
R215	RES. CAR. FILM	47 K 5% 1/6 W
R241	RES. CAR. FILM	220 R 5% 1/4 W
R242	RES. CAR. FILM	1 K 5% 1/4 W
R250	RES. CAR. FILM	4.7 K 5% 1/4 W
R251	RES. CAR. FILM	10 R 5% 1/4 W
R252	RES. CAR. FILM	22 K 5% 1/4 W
R253	RES. CAR. FILM	1.5 K 5% 1/4 W
R254	RES. CAR. FILM	1.5 K 5% 1/4 W
R255	RES. CAR. FILM	1.5 K 5% 1/4 W
R256	RES. CAR. FILM	1.5 K 5% 1/4 W
R26	RES. CAR. FILM	15 R 5% 1/4 W
R260	RES. NONFLAMABLE C. FILM	2.7 K 5% 1/2 W
R27	RES. CAR. FILM	150 R 5% 1/4 W

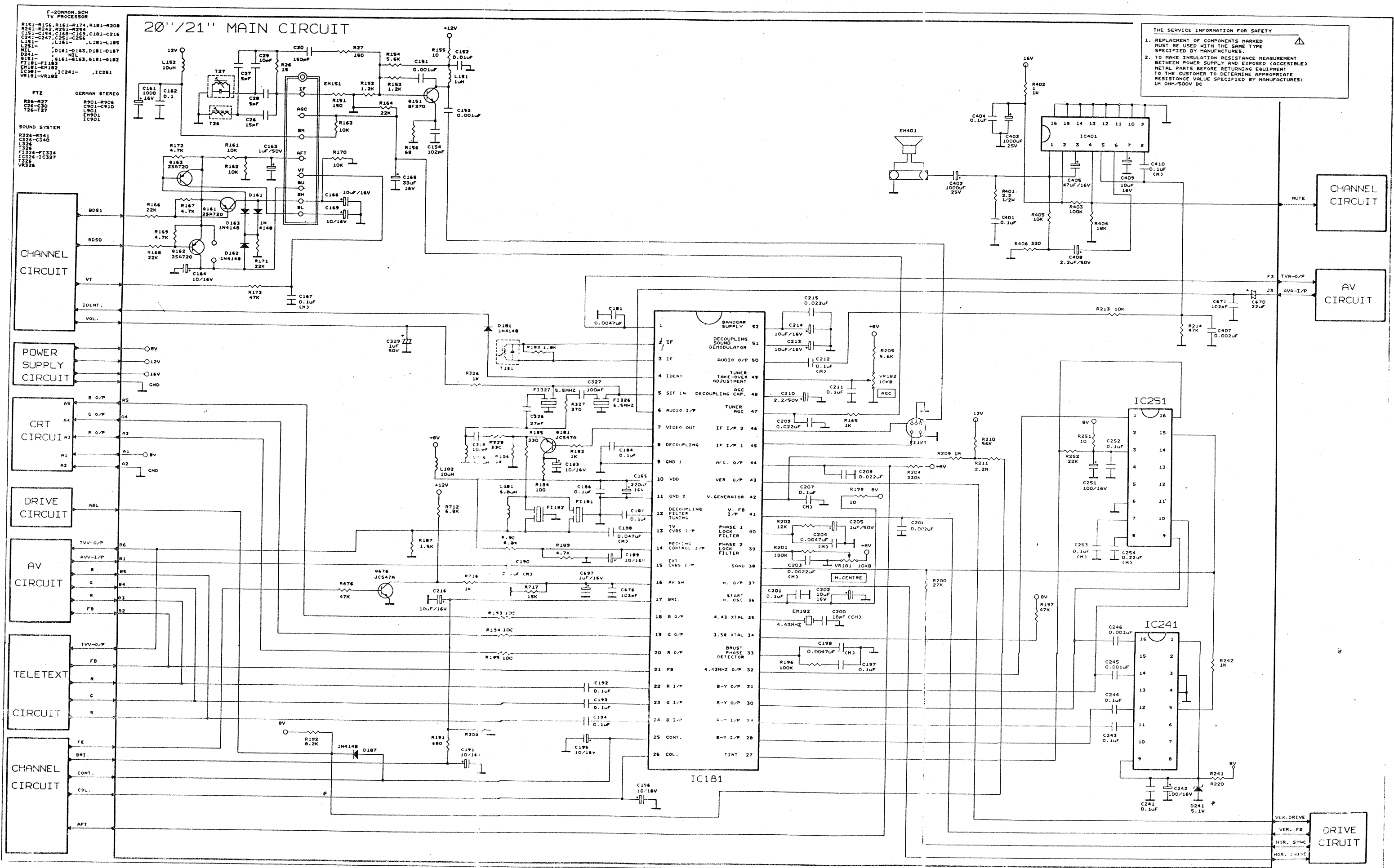
POS:	COMPONENT:	DESCRIPTION:
R310	RES. CAR. FILM	10 K 5% 1/4 W
R326	RES. CAR. FILM	1 K 5% 1/4 W
R327	RES. CAR. FILM	270 R 5% 1/4 W
R328	RES. CAR. FILM	330 R 5% 1/4 W
R350	RES. CAR. FILM	270 R 5% 1/6 W
R351	RES. CAR. FILM	100 R 5% 1/4 W
R352	RES. CAR. FILM	18 K 5% 1/4 W
R353	RES. CAR. FILM	4.7 K 5% 1/4 W
R354	RES. CAR. FILM	4.7 K 5% 1/4 W
R355	RES. CAR. FILM	22 K 5% 1/4 W
R356	RES. CAR. FILM	27 K 5% 1/4 W
R357	RES. CAR. FILM	47 K 5% 1/4 W
R358	RES. CAR. FILM	4.7 K 5% 1/4 W
R359	RES. CAR. FILM	12 K 5% 1/4 W
R360	RES. CAR. FILM	4.7 K 5% 1/4 W
R361	RES. CAR. FILM	22 K 5% 1/4 W
R362	RES. CAR. FILM	33 K 5% 1/4 W
R363	RES. CAR. FILM	100 K 5% 1/4 W
R364	RES. CAR. FILM	4.7 K 5% 1/4 W
R365	RES. CAR. FILM	22 K 5% 1/4 W
R366	RES. CAR. FILM	820 R 5% 1/4 W
R367	RES. CAR. FILM	6.8 K 5% 1/4 W
R368	RES. CAR. FILM	2.2 K 5% 1/4 W
R369	RES. CAR. FILM	47 R 5% 1/4 W
R370	RES. CAR. FILM	820 R 5% 1/4 W
R371	RES. CAR. FILM	68 K 5% 1/4 W
R372	RES. CAR. FILM	180 K 5% 1/4 W
R373	RES. CAR. FILM	100 R 5% 1/4 W
R374	RES. CAR. FILM	10 K 5% 1/4 W
R375	RES. CAR. FILM	47 K 5% 1/4 W
R376	RES. CAR. FILM	22 K 5% 1/4 W
R378	RES. CAR. FILM	910 R 5% 1/4 W
R379	RES. CAR. FILM	100 K 5% 1/4 W
R380	RES. CAR. FILM	15 K 5% 1/4 W
R381	RES. CAR. FILM	15 K 5% 1/4 W
R382	RES. CAR. FILM	1 K 5% 1/4 W
R383	RES. CAR. FILM	1 K 5% 1/4 W
R384	RES. CAR. FILM	1 K 5% 1/4 W
R385	RES. CAR. FILM	1 K 5% 1/4 W
R386	RES. CAR. FILM	9.1 K 5% 1/4 W
R387	RES. CAR. FILM	2.7 K 5% 1/4 W
R388	RES. CAR. FILM	1 K 5% 1/4 W
R389	RES. CAR. FILM	5.6 K 5% 1/4 W
R390	RES. CAR. FILM	6.8 K 5% 1/4 W
R391	RES. CAR. FILM	8.2 K 5% 1/4 W
R401	RES. M. O. FILM	2.2 R 5% 1/2 W
R401C	RES. CAR. FILM	2.2 K 5% 1/4 W
R402	RES. M. FILM FUSING	0.47 R 5% 1 W
R402C	RES. CAR. FILM	560 R 5% 1/4 W
R403C	RES. CAR. FILM	100 R 5% 1/4 W
R404	RES. CAR. FILM	18 K 5% 1/6 W
R404C	RES. CAR. FILM	100 R 5% 1/4 W
R405	RES. CAR. FILM	10 K 5% 1/6 W
R406	RES. CAR. FILM	330 R 5% 1/6 W
R407	RES. CAR. FILM	100 K 5% 1/6 W
R476	RES. CAR. FILM	22 K 5% 1/4 W
R477	RES. CAR. FILM	3.3 K 5% 1/4 W
R478	RES. CAR. FILM	15 R 5% 1/4 W

POS:	COMPONENT:	DESCRIPTION:
R479	RES. CAR. FILM	.12 K 5% 1/4 W
R480	RES. CAR. FILM	.47 K 5% 1/4 W
R481	RES. CAR. FILM	.18 K 5% 1/4 W
R482	RES. CAR. FILM	.39 K 5% 1/6 W
R483	RES. CAR. FILM	.68 K 5% 1/4 W
R484	RES. CAR. FILM	.47 K 5% 1/4 W
R485	RES. CAR. FILM	.18 K 5% 1/4 W
R486	RES. CAR. FILM	.15 K 5% 1/6 W
R487	RES. CAR. FILM	.33 K 5% 1/4 W
R488	RES. CAR. FILM	.47 K 5% 1/4 W
R489	RES. CAR. FILM	.18 K 5% 1/4 W
R490	RES. CAR. FILM	.10 K 5% 1/6 W
R491	RES. CAR. FILM	.33 K 5% 1/6 W
R492	RES. CAR. FILM	.100 K 5% 1/4 W
R493	RES. CAR. FILM	.18 K 5% 1/4 W
R494	RES. CAR. FILM	.10 K 5% 1/6 W
R495	RES. CAR. FILM	.56 K 5% 1/6 W
R496	RES. CAR. FILM	.18 K 5% 1/6 W
R498	RES. CAR. FILM	.47 K 5% 1/6 W
R499	RES. CAR. FILM	.22 K 5% 1/4 W
503	RES. CAR. FILM	.1 K 5% 1/4 W
R504	RES. CAR. FILM	.100 R 5% 1/4 W
R505	RES. CAR. FILM	.1 K 5% 1/4 W
R506	RES. CAR. FILM	.100 R 5% 1/4 W
R507	RES. CAR. FILM	.1.2 K 5% 1/4 W
R508	RES. CAR. FILM	.1.5 K 5% 1/4 W
R509	RES. CAR. FILM	.1.5 K 5% 1/4 W
R51	RES. CAR. FILM	.390 R 5% 1/4 W
R510	RES. CAR. FILM	.1.5 K 5% 1/4 W
R511	RES. CAR. FILM	.1.5 K 5% 1/4 W
R512	RES. CAR. FILM	.10 K 5% 1/4 W
R513	RES. CAR. FILM	.10 K 5% 1/4 W
R514	RES. CAR. FILM	.10 K 5% 1/4 W
R515	RES. CAR. FILM	.47 K 5% 1/4 W
R516	RES. CAR. FILM	.100 R 5% 1/4 W
R517	RES. CAR. FILM	.1 K 5% 1/4 W
R518	RES. CAR. FILM	.470 R 5% 1/4 W
R519	RES. CAR. FILM	.1.8 K 5% 1/4 W
R52	RES. NONFLAMABLE C. FILM	.2.7 K 5% 1/2 W
520	RES. CAR. FILM	.1.5 K 5% 1/4 W
R521	RES. CAR. FILM	.5.6 K 5% 1/4 W
R522	RES. CAR. FILM	.47 K 5% 1/4 W
R523	RES. CAR. FILM	.1.8 K 5% 1/4 W
R524	RES. CAR. FILM	.4.7 K 5% 1/4 W
R525	RES. CAR. FILM	.15 K 5% 1/4 W
R526	RES. CAR. FILM	.100 K 5% 1/4 W
R527	RES. CAR. FILM	.150 K 5% 1/4 W
R528	RES. CAR. FILM	.100 R 5% 1/4 W
R529	RES. CAR. FILM	.3.3 K 5% 1/4 W
R53	RES. M. O. FILM	.10 K 5% 2 W
R530	RES. CAR. FILM	.100 R 5% 1/4 W
R531	RES. CAR. FILM	.3.3 K 5% 1/4 W
R532	RES. CAR. FILM	.220 K 5% 1/4 W
R533	RES. CAR. FILM	.100 K 5% 1/4 W
R534	RES. CAR. FILM	.47 K 5% 1/4 W
R535	RES. CAR. FILM	.56 K 5% 1/4 W
R54	RES. CAR. FILM	.820 R 5% 1/4 W
R549	RES. CAR. FILM	.2.2 K 5% 1/4 W

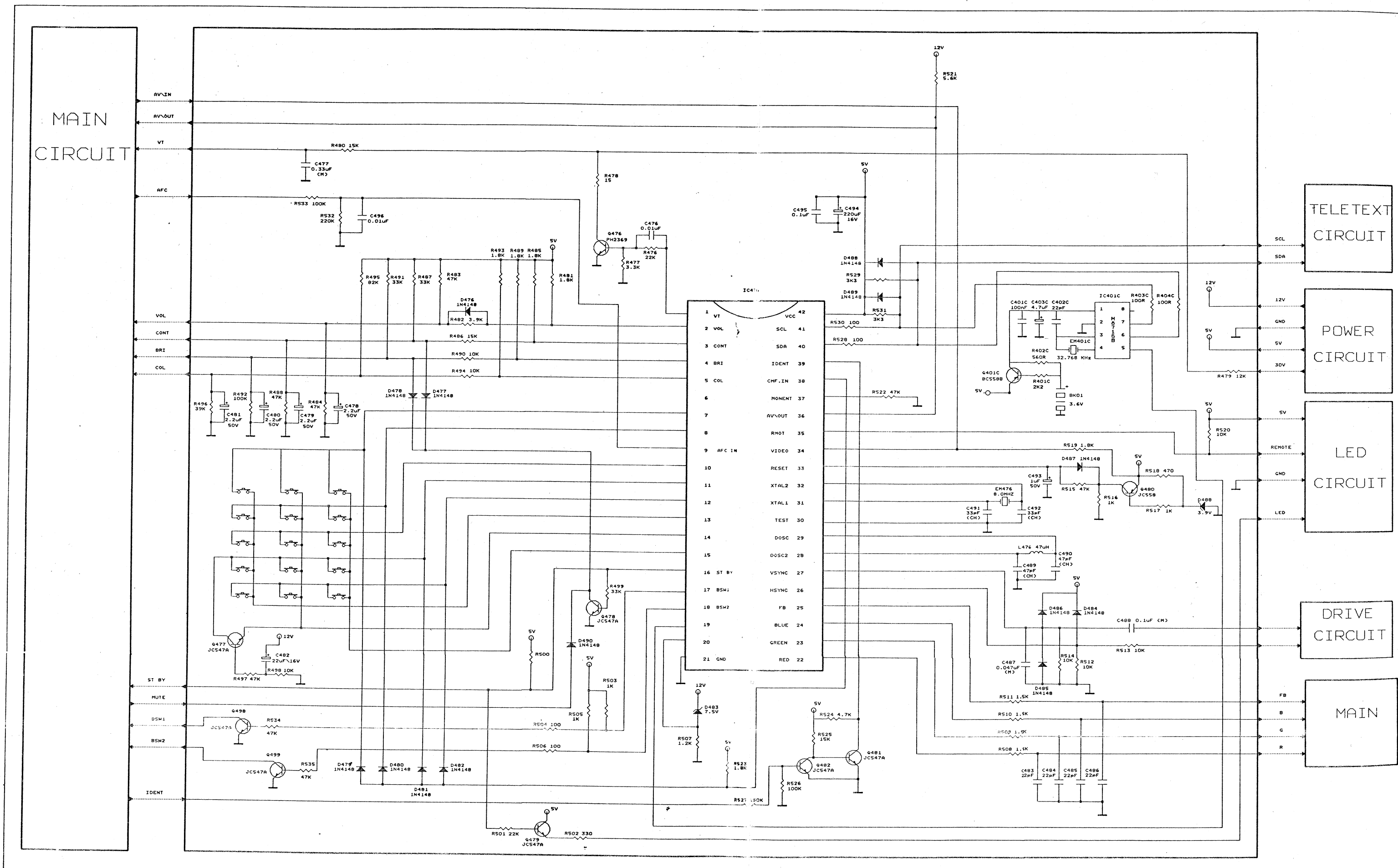
POS:.....	COMPONENT:	DESCRIPTION:
R55.....	RES. CAR. FILM	2.2 K 5% 1/4 W
R56.....	RES. CAR. FILM	470 R 5% 1/4 W
R57.....	RES. CAR. FILM	100 R 5% 1/4 W
R576.....	RES. CAR. FILM	3.3 K 5% 1/4 W
R578.....	RES. NONFLAMABLE C. FILM	270 R 5% 1 W
R579.....	RES. CAR. FILM	4.7 R 5% 1/4 W
R58.....	RES. CAR. FILM	390 R 5% 1/4 W
R581.....	RES. CAR. FILM	15 K 5% 1/4 W
R582.....	RES. CAR. FILM	33 R 5% 1/4 W
R583.....	RES. M. O. FILM	1.5 R 5% 1 W
R584.....	RES. CAR. FILM	56 K 5% 1/4 W
R585.....	RES. CAR. FILM	100 R 5% 1/4 W
R586.....	RES. CAR. FILM	22 K 5% 1/4 W
R587.....	RES. CAR. FILM	10 K 5% 1/4 W
R589.....	RES. NONFLAMABLE C. FILM	220 R 5% 1/2 W
R59.....	RES. NONFLAMABLE C. FILM	2.7 K 5% 1/2 W
R590.....	RES. CAR. FILM	20 K 5% 1/4 W
R596.....	RES. CAR. FILM	4.7 K 5% 1/4 W
R597.....	RES. CAR. FILM	47 R 5% 1/4 W
R598.....	RES. M. O. FILM	10 K 5% 2 W
R599.....	RES. CEMENT	2 K %10 5 W
R60.....	RES. M. O. FILM	10 K 5% 2 W
R601.....	RES. CEMENT	5.6 R %10 5 W
R602.....	RES. CAR. FILM	4.7 K 5% 1/4 W
R603.....	RES. M. O. FILM	1 K 5% 3 W
R604.....	RES. CAR. FILM	22 K 5% 1/4 W
R606.....	RES. CAR. FILM	8.2 K 5% 1/4 W
R608.....	RES. M. FILM FUSING	1 R 5% 1 W
R609.....	RES. CAR. FILM	1 K 5% 1/4 W
R61.....	RES. CAR. FILM	2.2 K 5% 1/4 W
R610.....	RES. M. FILM FUSING	0.22 R 5% 1/2 W
R62.....	RES. CAR. FILM	470 R 5% 1/4 W
R63.....	RES. CAR. FILM	100 R 5% 1/4 W
R64.....	RES. CAR. FILM	680 R 5% 1/4 W
R65.....	RES. CAR. FILM	390 R 5% 1/4 W
R66.....	RES. NONFLAMABLE C. FILM	2.7 K 5% 1/2 W
R67.....	RES. M. O. FILM	10 K 5% 2 W
R68.....	RES. CAR. FILM	2.2 K 5% 1/4 W
R69.....	RES. CAR. FILM	470 R 5% 1/4 W
R694.....	RES. CAR. FILM	75 R 5% 1/4 W
R695.....	RES. CAR. FILM	680 R 5% 1/4 W
R696.....	RES. CAR. FILM	33 K 5% 1/4 W
R697.....	RES. CAR. FILM	33 K 5% 1/4 W
R70.....	RES. CAR. FILM	100 R 5% 1/4 W
R700.....	RES. CAR. FILM	75 R 5% 1/4 W
R701.....	RES. CAR. FILM	680 R 5% 1/4 W
R702.....	RES. CAR. FILM	75 R 5% 1/4 W
R703.....	RES. CAR. FILM	680 R 5% 1/4 W
R704.....	RES. CAR. FILM	75 R 5% 1/4 W
R706.....	RES. CAR. FILM	680 R 5% 1/4 W
R707.....	RES. CAR. FILM	1 K 5% 1/4 W
R708.....	RES. CAR. FILM	75 R 5% 1/4 W
R709.....	RES. CAR. FILM	680 R 5% 1/4 W
R71.....	RES. CAR. FILM	680 R 5% 1/4 W
R717.....	RES. CAR. FILM	15 K 5% 1/4 W
R718.....	RES. CAR. FILM	470 R 5% 1/4 W
R719.....	RES. CAR. FILM	470 R 5% 1/4 W
R72.....	RES. CAR. FILM	3.3 K 5% 1/4 W

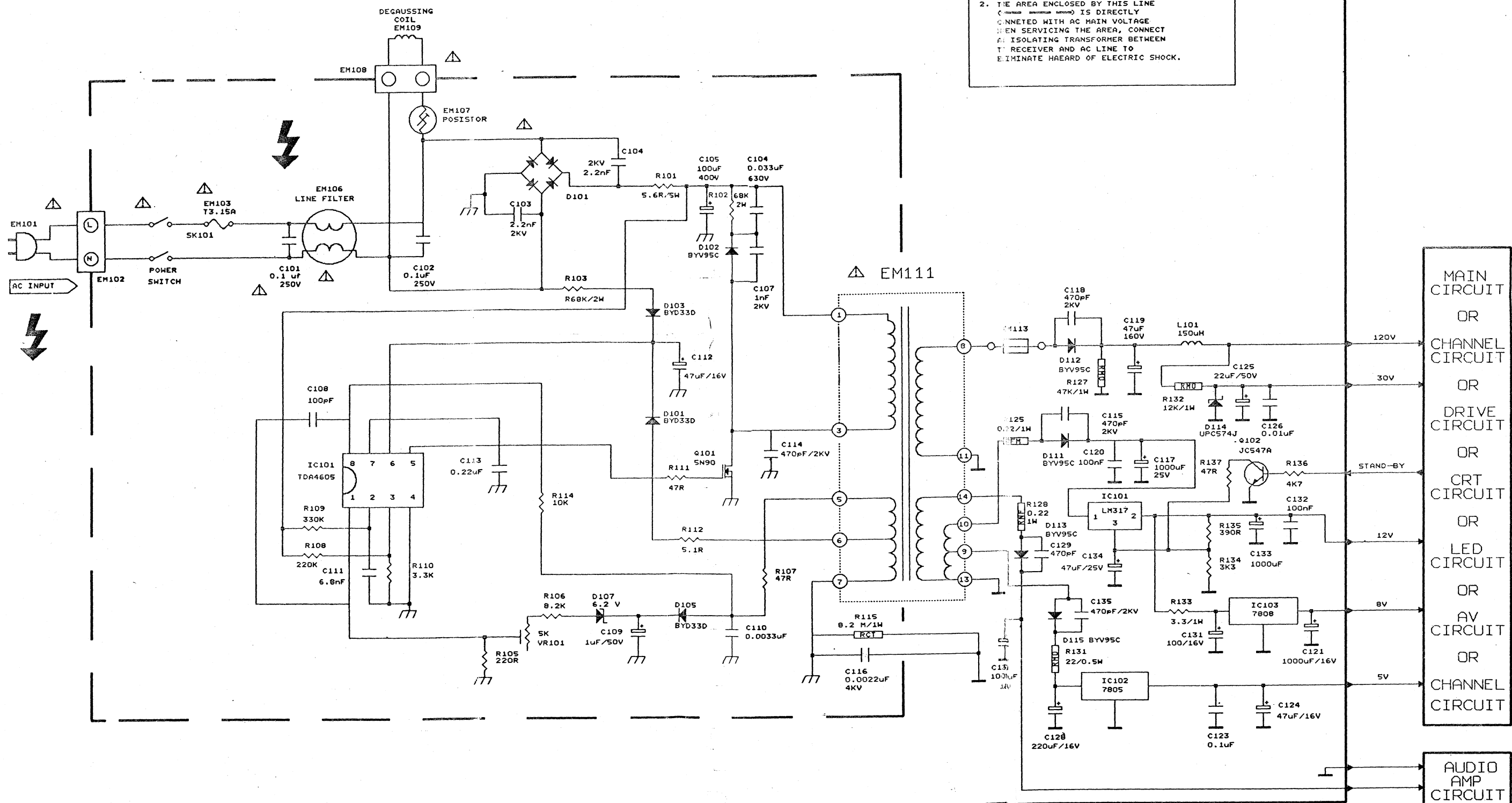
POS:	COMPONENT:	DESCRIPTION:
R721	RES. CAR. FILM	.220 R 5% 1/4 W
R73	RES. CAR. FILM	2.2 M 5% 1/4 W
R734	RES. CAR. FILM	.470 R 5% 1/4 W
R735	RES. CAR. FILM	.1 K 5% 1/4 W
R736	RES. CAR. FILM	.3.3 K 5% 1/4 W
R737	RES. CAR. FILM	.1.8 K 5% 1/4 W
R738	RES. CAR. FILM	.3.3 K 5% 1/4 W
R739	RES. CAR. FILM	.1.8 K 5% 1/4 W
R74	RES. CAR. FILM	.1.5 K 5% 1/4 W
R740	RES. CAR. FILM	.3.3 K 5% 1/4 W
R741	RES. CAR. FILM	.1.8 K 5% 1/4 W
R743	RES. CAR. FILM	.1.2 K 5% 1/4 W
R744	RES. CAR. FILM	.10 K 5% 1/4 W
R745	RES. CAR. FILM	.3.3 K 5% 1/4 W
R746	RES. CAR. FILM	.330 R 5% 1/4 W
R747	RES. CAR. FILM	.470 R 5% 1/4 W
R748	RES. CAR. FILM	.68 K 5% 1/4 W
R749	RES. CAR. FILM	.6.8 K 5% 1/4 W
R75	RES. CAR. FILM	.10 K 5% 1/4 W
R750	RES. CAR. FILM	.6.8 K 5% 1/4 W
R751	RES. CAR. FILM	.10 K 5% 1/4 W
R753	RES. CAR. FILM	.22 K 5% 1/4 W
R756	RES. CAR. FILM	.100 R 5% 1/4 W
R757	RES. CAR. FILM	.100 R 5% 1/4 W
R76	RES. CAR. FILM	.10 K 5% 1/4 W
R761	RES. CAR. FILM	.100 R 5% 1/4 W
R762	RES. CAR. FILM	.2.2 K 5% 1/4 W
R763	RES. CAR. FILM	.56 K 5% 1/4 W
R765	RES. CAR. FILM	.220 R 5% 1/4 W
R77	RES. CAR. FILM	.10 K 5% 1/4 W
R776	RES. CAR. FILM	.8.2 K 5% 1/4 W
R777	RES. CAR. FILM	.33 K 5% 1/4 W
R778	RES. CAR. FILM	.33 K 5% 1/4 W
R779	RES. CAR. FILM	.4.7 K 5% 1/4 W
R780	RES. CAR. FILM	.1.5 K 5% 1/4 W
R781	RES. CAR. FILM	.470 R 5% 1/4 W
RDX	RES. M. O. FILM	.39 R 5% 1/2 W
SW101	SWITCH, POWER	
T181	COIL, TUNING CIRCUIT	.39.5 MHZ (AFC)
T26	COIL, TOKO	.31.9 MHZ
T27	COIL, TOKO	.40 MHZ
JC726	CAP. CER. TRIMMER	.30 pf
VR101	TRIMPOT, CARBON	.5 K 6MM 20 %0.5W VERT.
VR181	TRIMPOT, CARBON	.10 K 20% 0.5W VERT.
VR182	TRIMPOT, CARBON	.10 K 20% 0.5W VERT.
VR351	TRIMPOT, CARBON	.47 K 20% 0.5W VERT. PT6V
VR51	TRIMPOT, CARBON	.10 K 20% 0.5W HORZ.
VR52	TRIMPOT, CARBON	.10 K 20% 0.5W HORZ.
VR53	TRIMPOT, CARBON	.500 R 6 MM 20% 0.5W HORZ.
VR54	TRIMPOT, CARBON	.10 K 20% 0.5W HORZ.
VR55	TRIMPOT, CARBON	.500R 6 MM 20% 0.5W HORZ.
VR576	TRIMPOT, CARBON	.500 R 6 MM 20% 0.5W VERT.
VR577	TRIMPOT, CARBON	.10 K 20% 0.5W VERT.
WC426	WIRE CONNECTOR	.5 PIN WIRE CON. W 2 CNN
WC51	WIRE CONNECTOR	.5 PIN WIRE CON. W 2 CNN
WC51	CONNECTOR	.5P
WC576	WIRE CONNECTOR	.4 PIN WIRE (3P) CON. W 2 CNN
WC726	WIRE CONNECTOR	.6 PIN WIRE CON. W 2 CNN
WC731	CONNECTOR	.2P
WC737	WIRE CONNECTOR	.2 PIN WIRE CON. W 2 CNN

SM-1 MONO CHASSIS



SIS CIRCUIT DIAGRAM

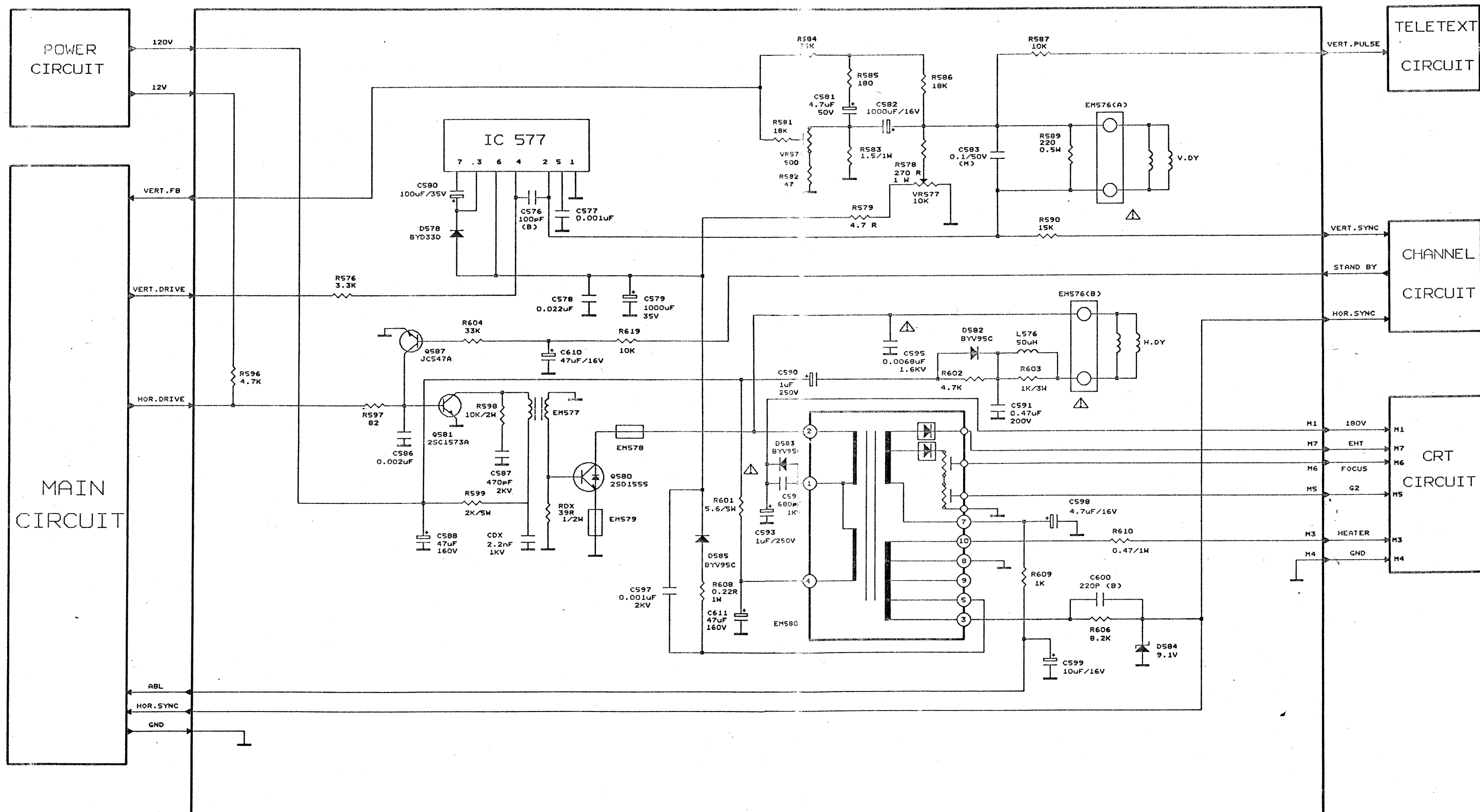




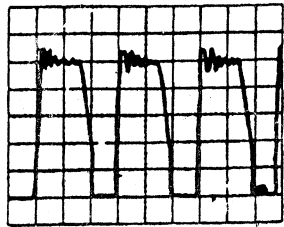
POWER CIRCUIT

R573-R619
C573-C610
D573-D583
EM576-EM580
VR576-VR578
Q573-Q581
IC576
L573-L577

20"/21" DRIVE CIRCUIT

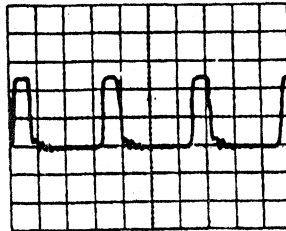


1) 5 usn/div 100 volt/div



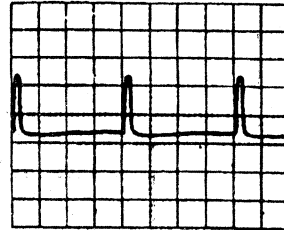
Collector of Q101

2) 20 usn/div 2volt/div



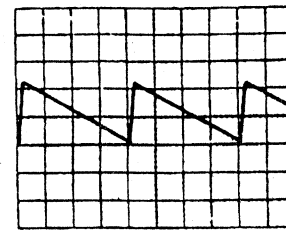
IC-476 pin 26

3) 5m sn/div 2volt/div



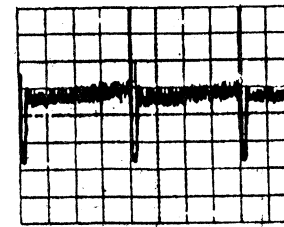
IC-476 pin 27

4) 5 msn/div 0,5 volt/div



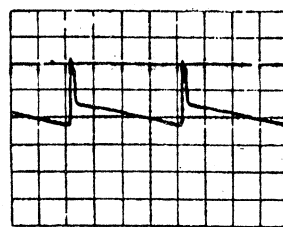
IC-181 pin 41

5) 5 msn/div 1 volt/div



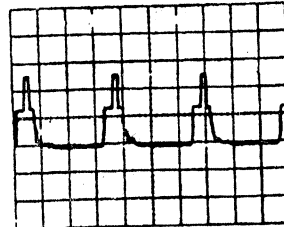
IC-577 pin 4

6) 5 msn/div 20 volt/div



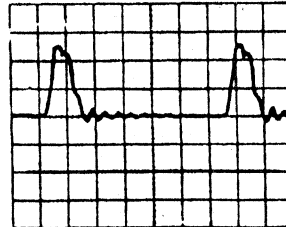
IC-577 pin 2

7) 20 usn/div 2 volt/div



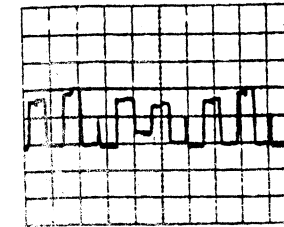
IC-181 pin 38

8) 10 usn/div 50 volt/div



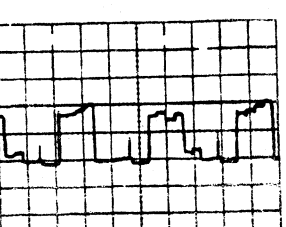
Cathode of D 584

9) 20 usn/div 2 volt/div



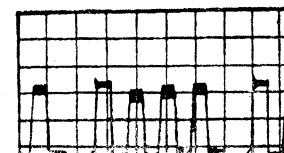
IC-181 pin 20

10) 20 usn/div 2 volt/div

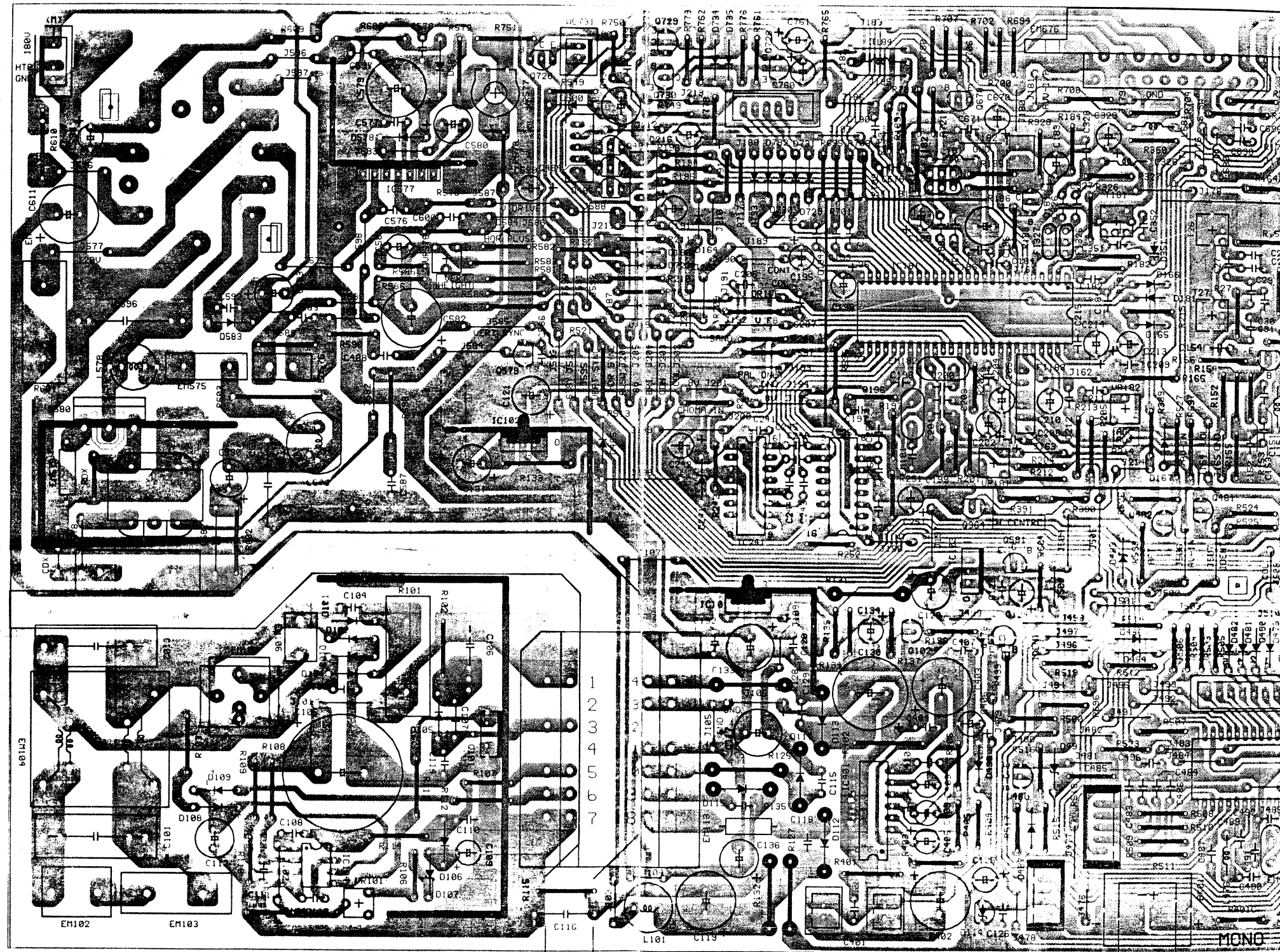
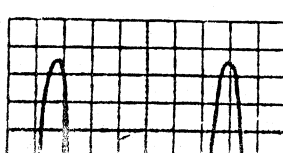


IC-181 pin 19

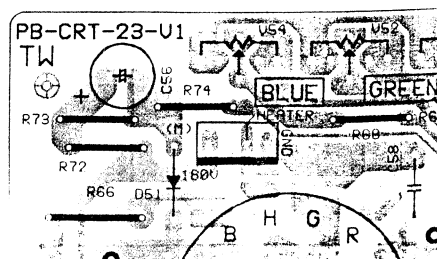
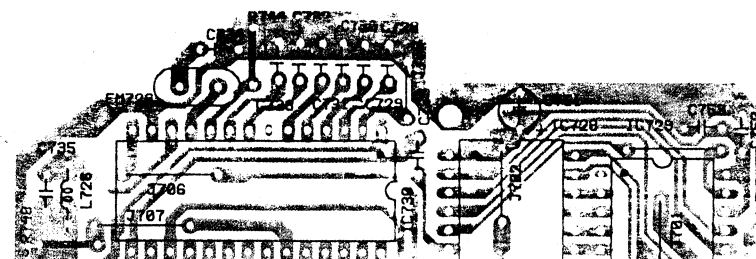
11) 10 usn/div 2 volt/div

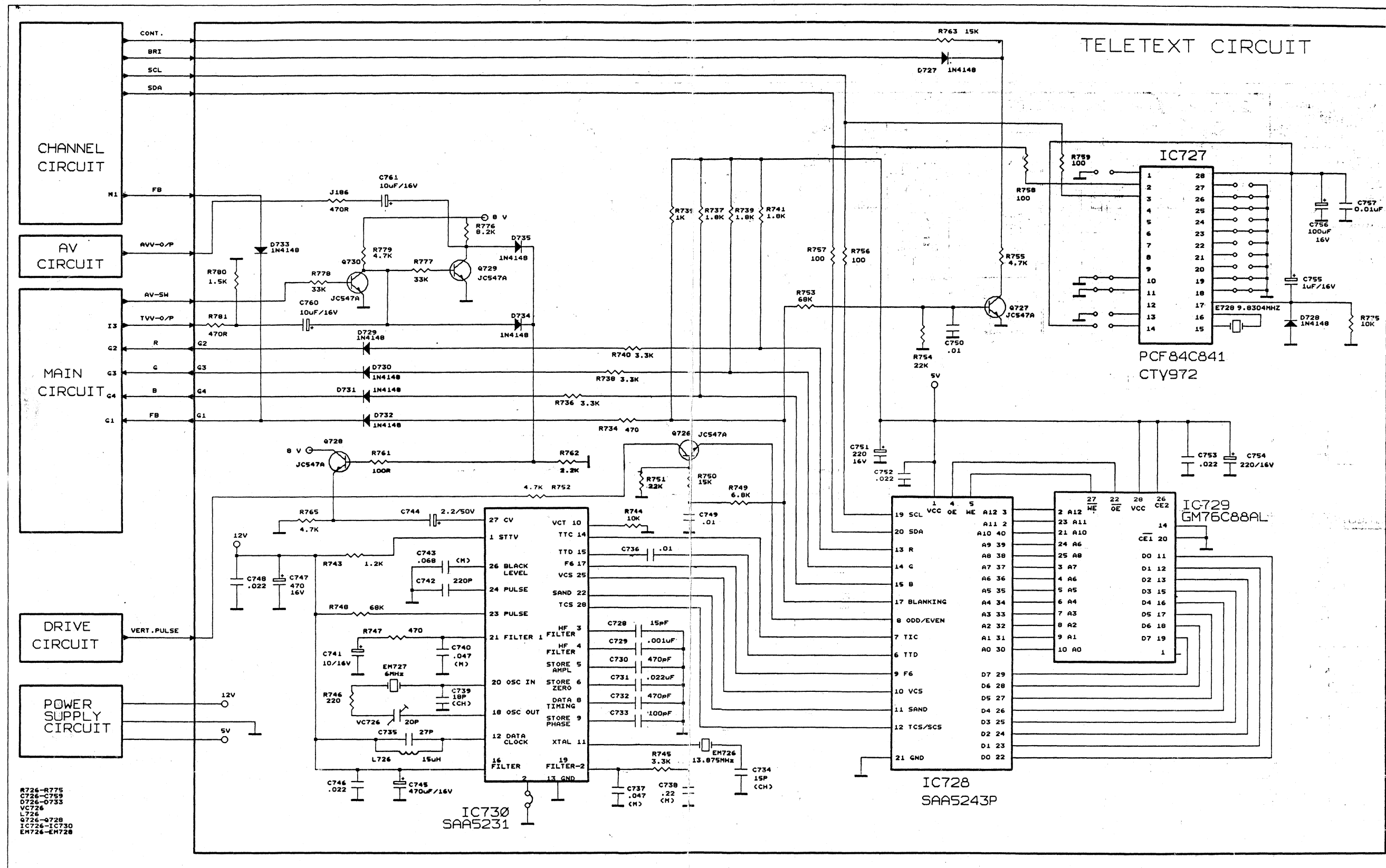
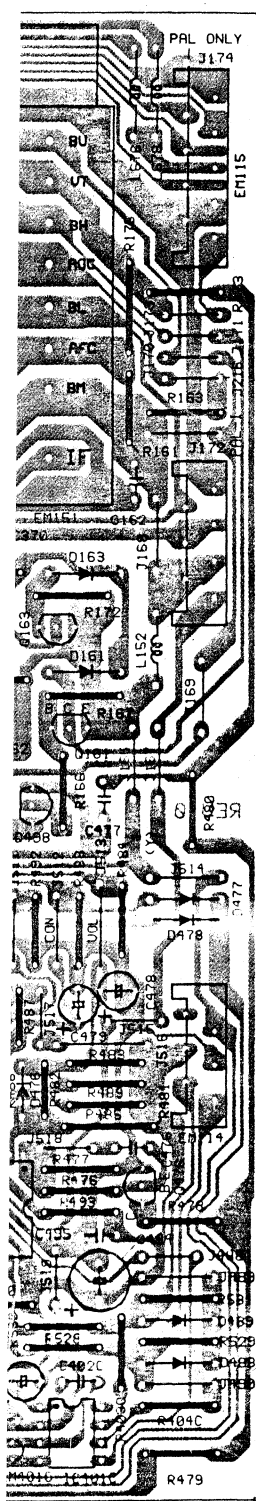


12) 10 usn/div 200 volt/div

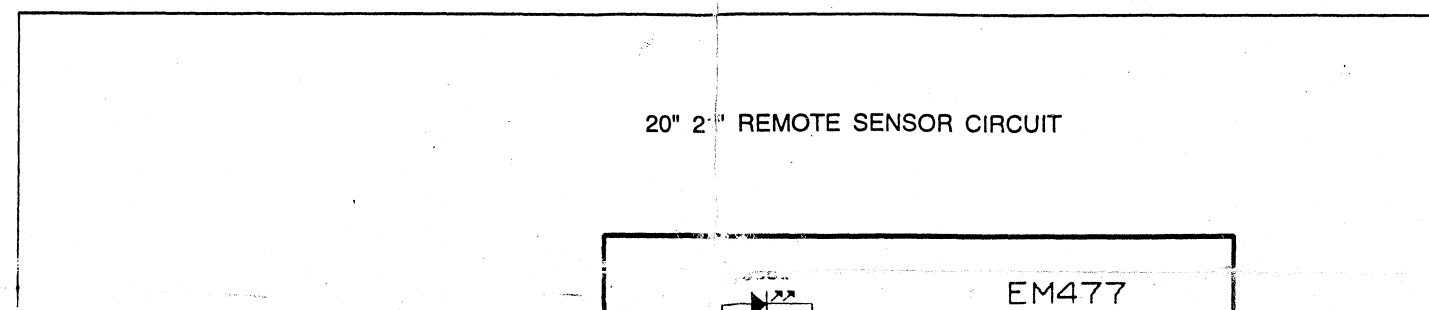
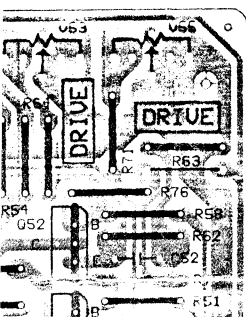


MAIN PCB





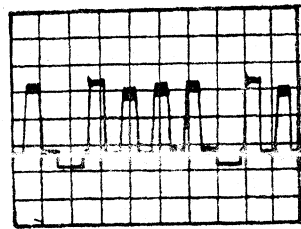
TELETEXT CIRCUIT



20" 2" REMOTE SENSOR CIRCUIT

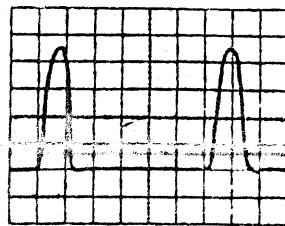
EM477

11) 10 usn/div 2 volt/div



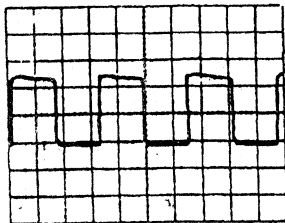
IC-181 pin 18

12) 10 usn/div 200 volt/div



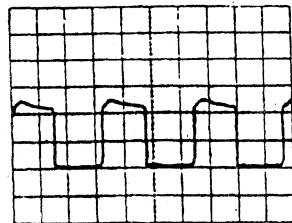
Collector of Q 580

13) 20 usn/div 0.5 volt/div



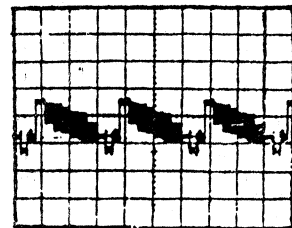
IC-181 pin 37

14) 20 usn/div 50 volt/div



Collector of Q 581

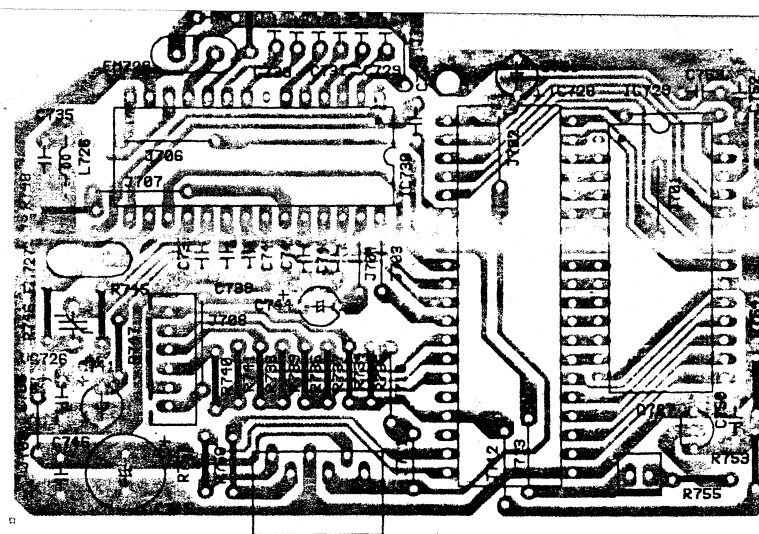
15) 20 usn/div 1 volt/div



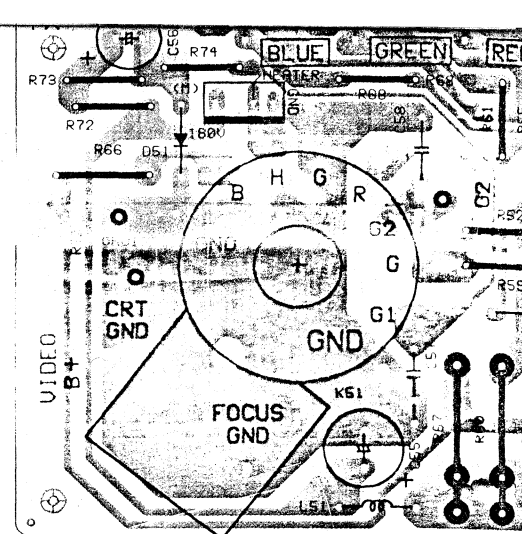
IC-181 pin 13

OSSILOSCOPE SHAPES

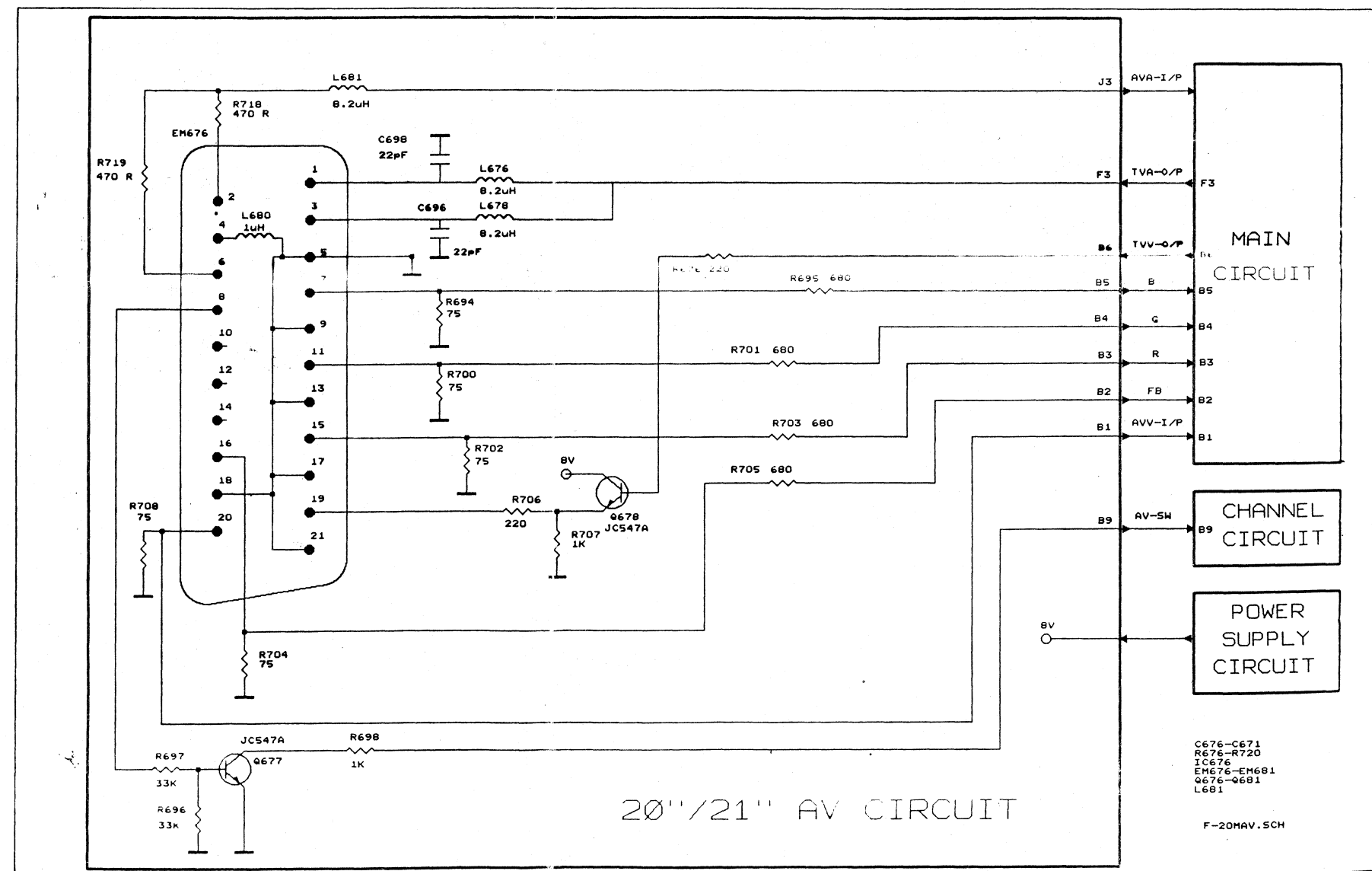
TUBE	C 595	R 610	TUBE SOCKET	LOSS COIL
14" EKRANAS	6.8 nF	0.22R (0.5W)	NARROW NECK	-----
20" EKRANAS	7.8 nF	0.47R (1W)	NARROW NECK	56 uH
20" SAMSUNG	9.1 nF	0.47R (1W)	NARROW NECK	56 uH
21"EKRANAS	8.2 nF	0.47R (1W)	NARROW NECK	150 uH
21"VIDEOCOLOR	7.8 nF	0.22R (0.5W)	NARROW NECK	150 uH

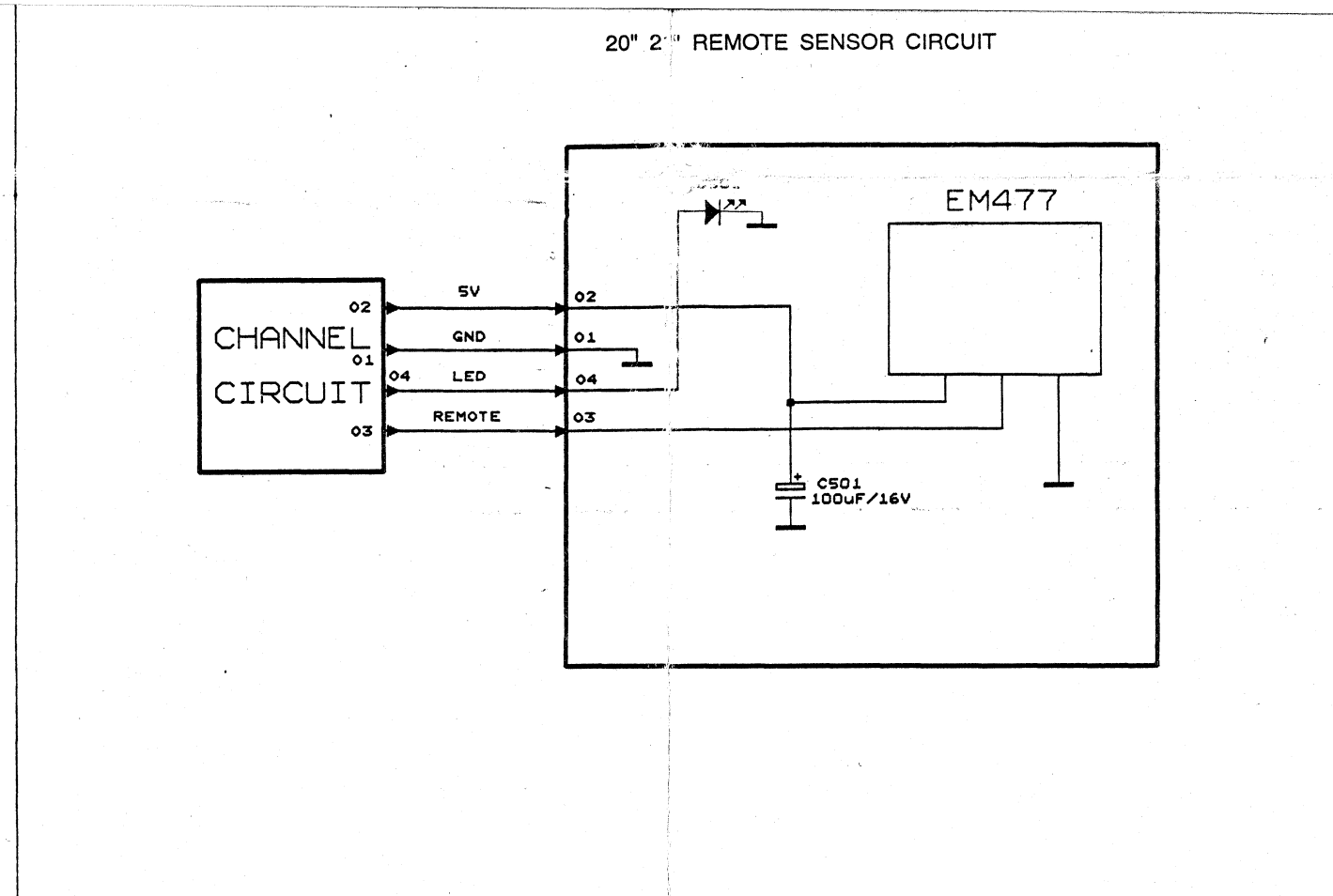


TELETEXT PCB



CRT PCB

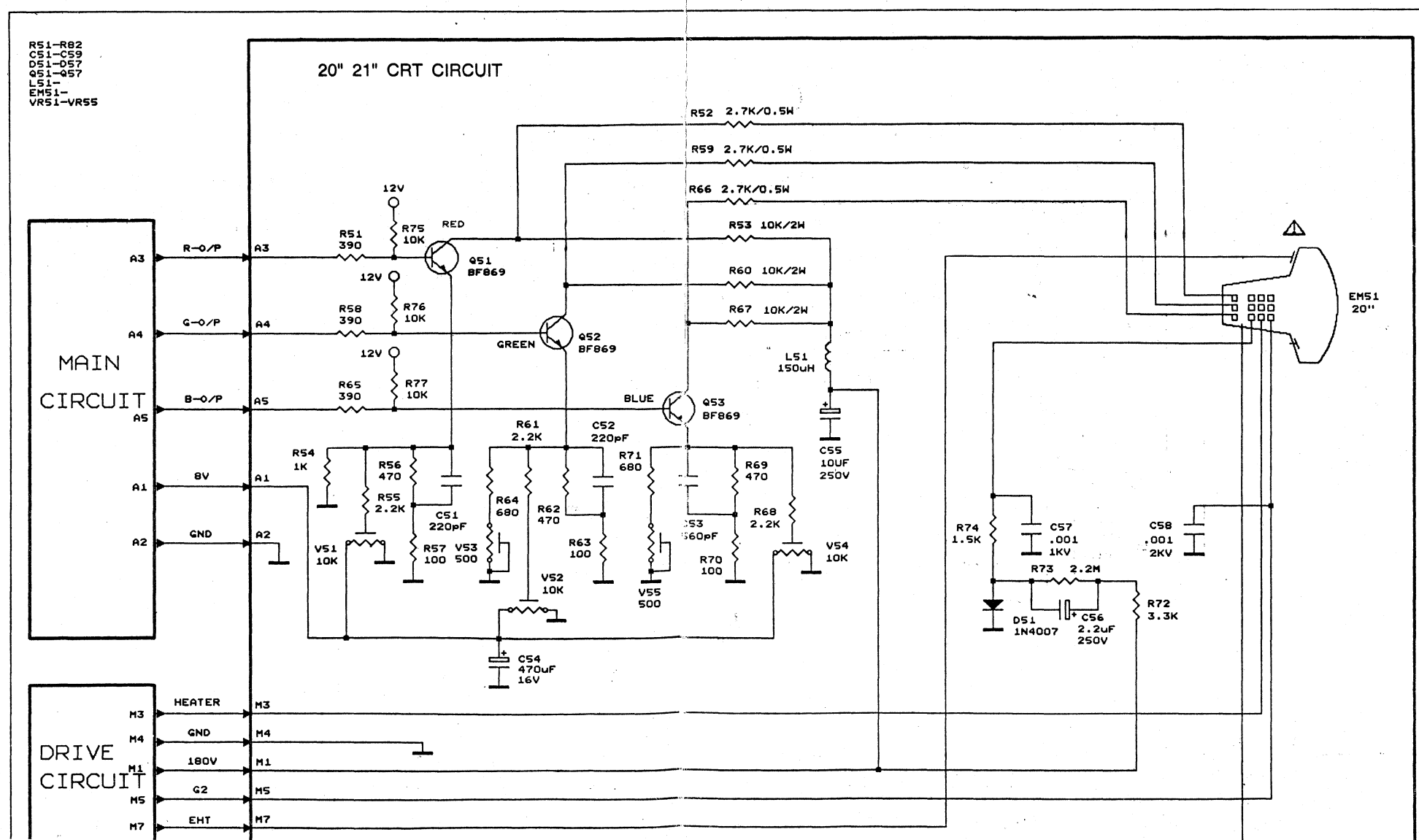




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28" DRIVE CIRCUIT

MAIN
CIRCUITPOWER
SUPPLY
CIRCUITR576-R618
C576-C609
D576-D583
EM576-EM580
VR576-VR578
Q576-Q581
IC576
LS76-LS77CHANNEL
CIRCUITTELETEXT
CIRCUITCRT
CIRCUIT

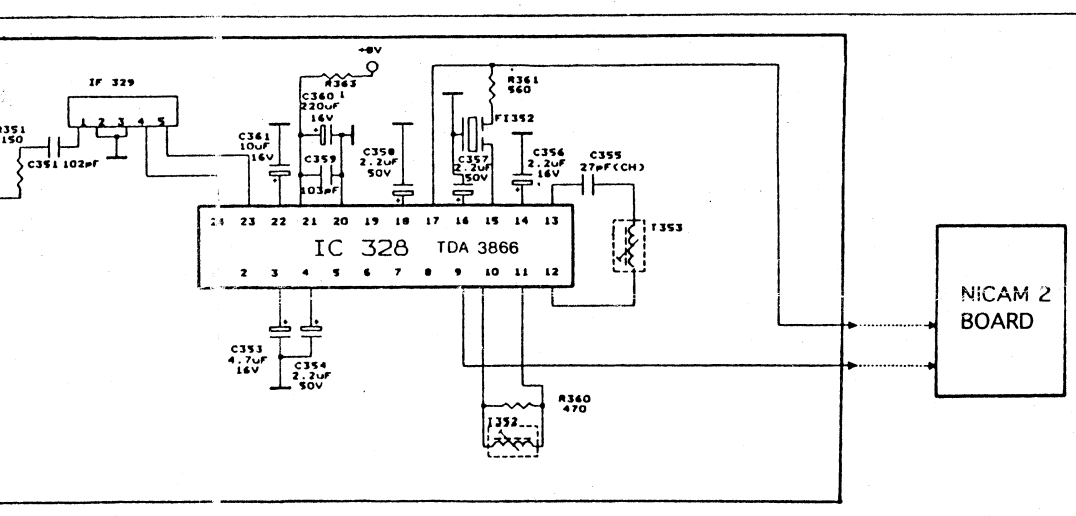
NICAM 1

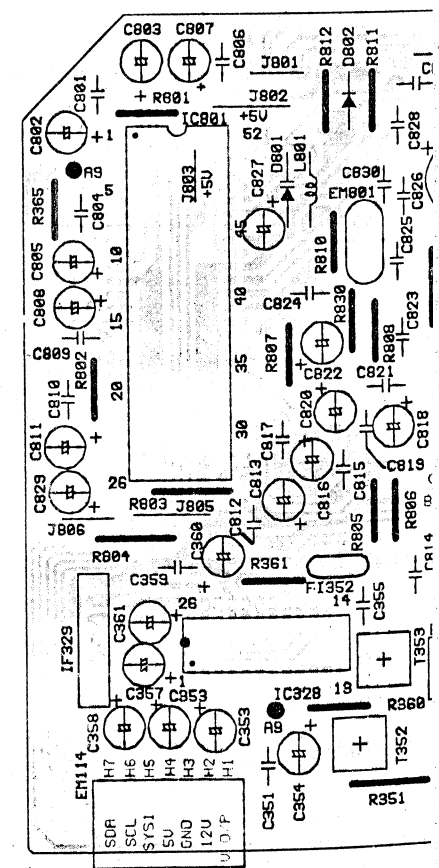
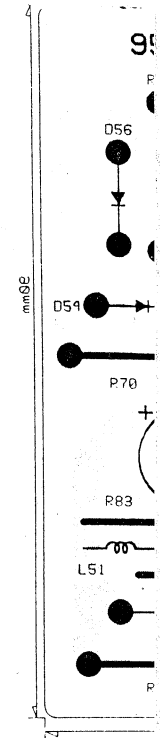
MAIN
BOARD

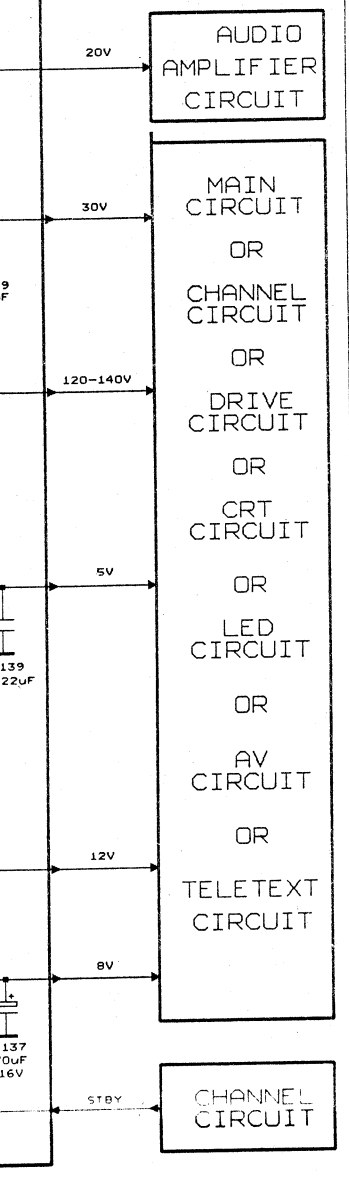
28" POWER CIRCUIT

THE SERVICE INFORMATION FOR SAFE Y

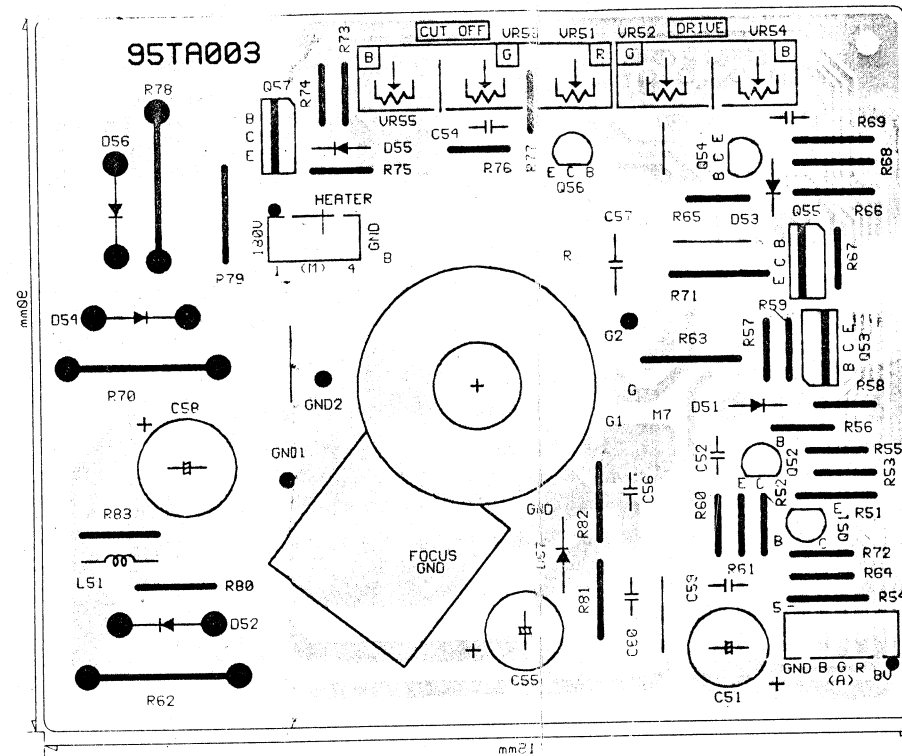
1. REPLACEMENT OF COMPONENTS MARKED
MUST BE USED WITH THE SAME TYPE
SPECIFIED BY MANUFACTURERS.2. THE AREA ENCLOSED BY THIS LINE
SHOULD BE DIRECTLY
CONNECTED WITH AC MAIN VOLTAGER101-R116, R120-R128
C101-C116, C120-C132, C135-C140
D101-D105, D120-D126
EM101-EM108, EM120
VR101, N1L
IC101, IC122-IC123
Q101, Q120-Q123
N1L, L120-L122
SW101



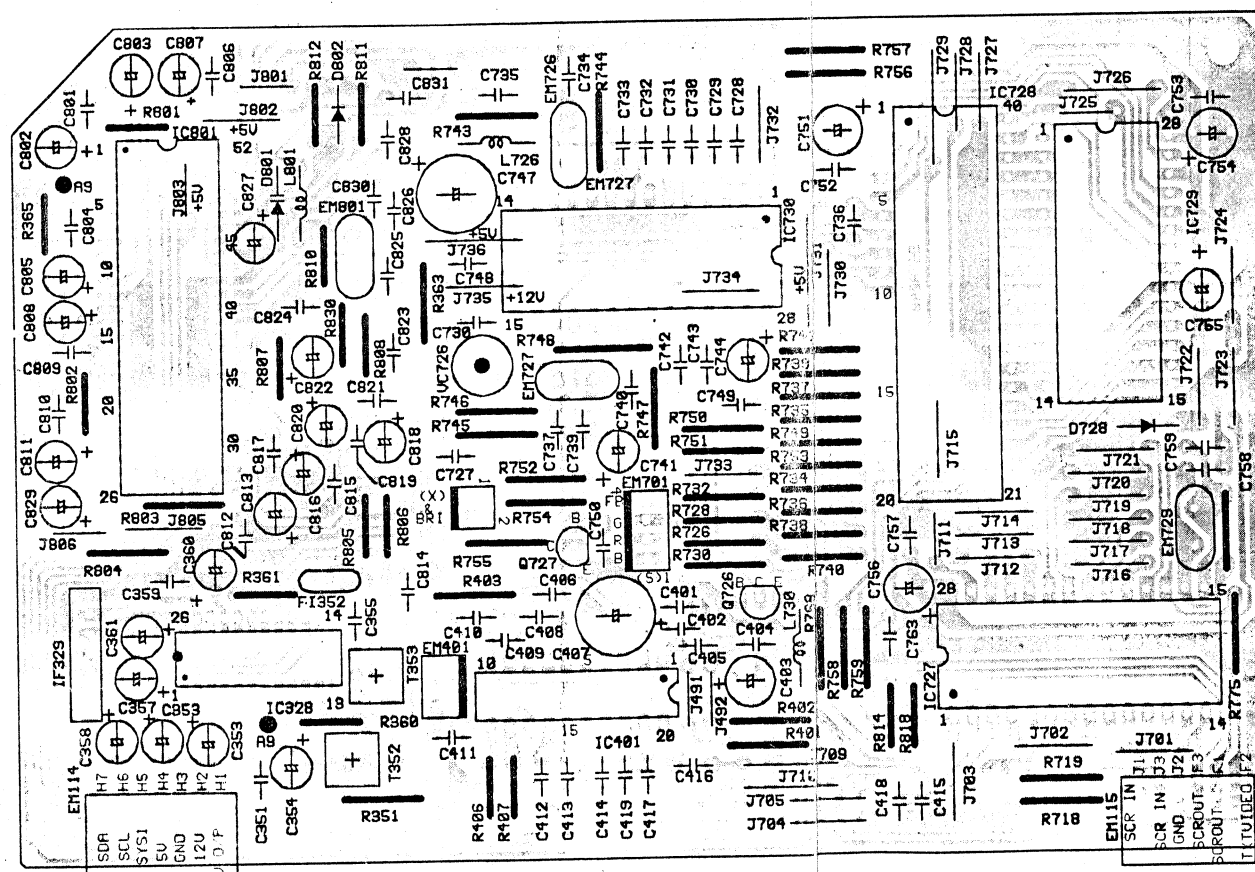


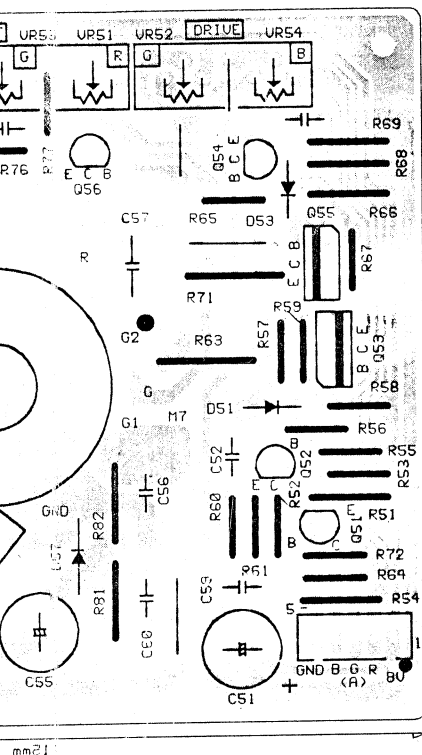


CRT PCB

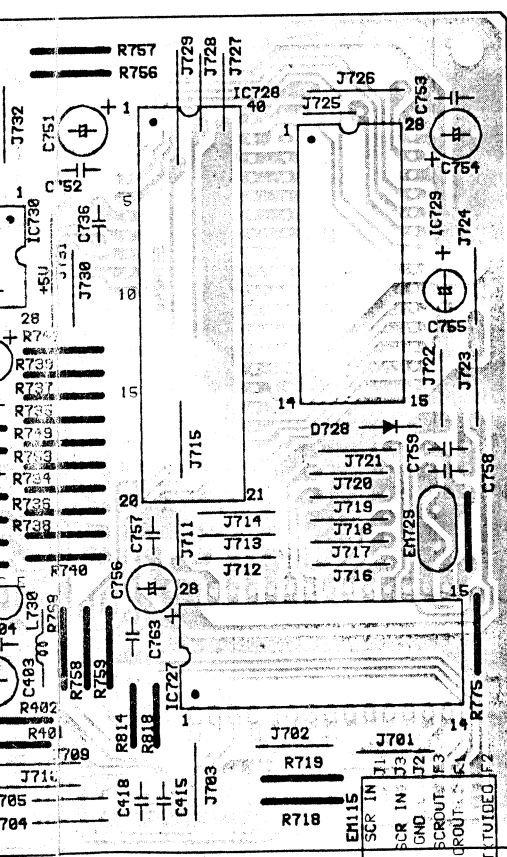
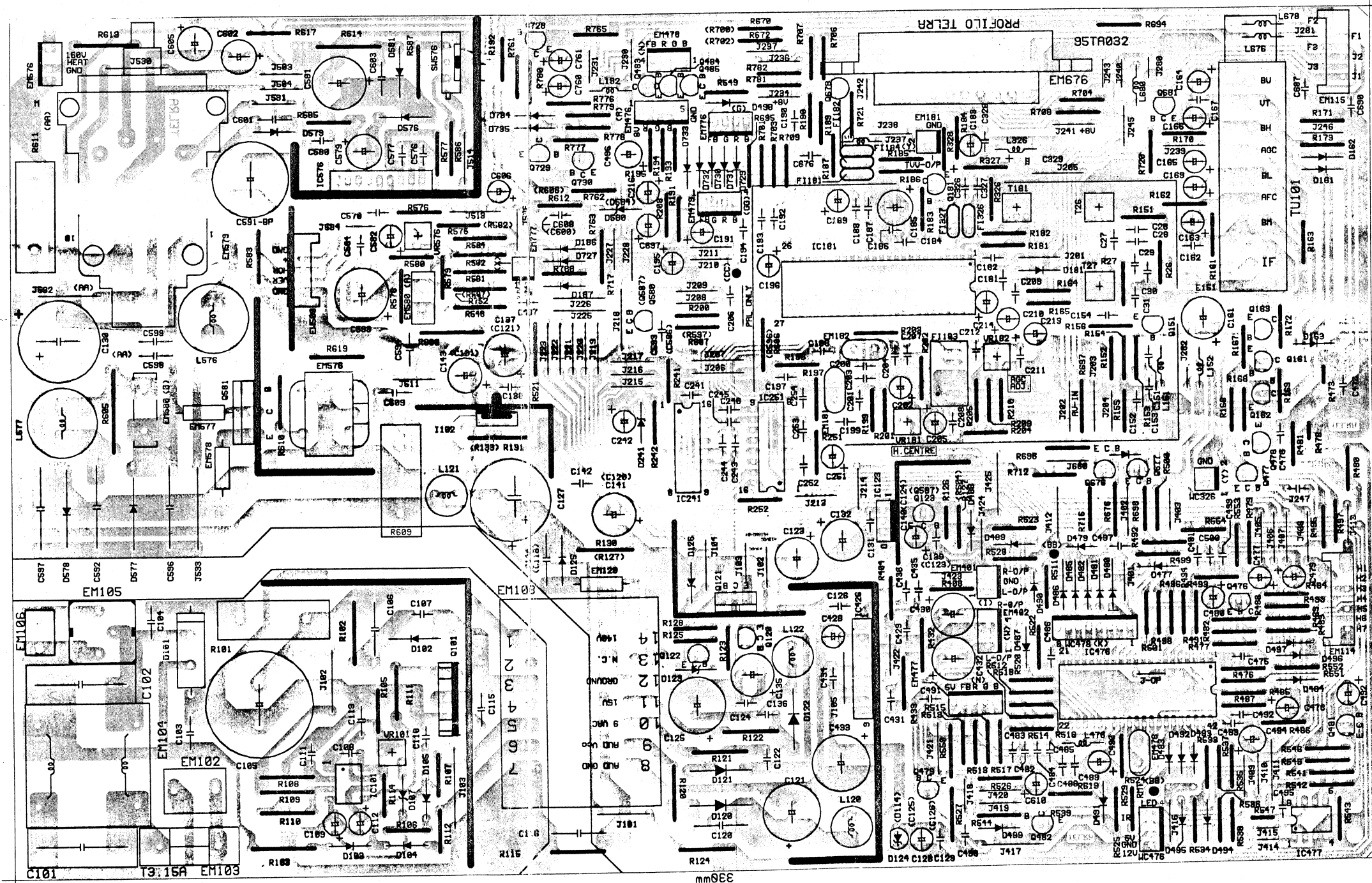


NICAM/TXT PCB

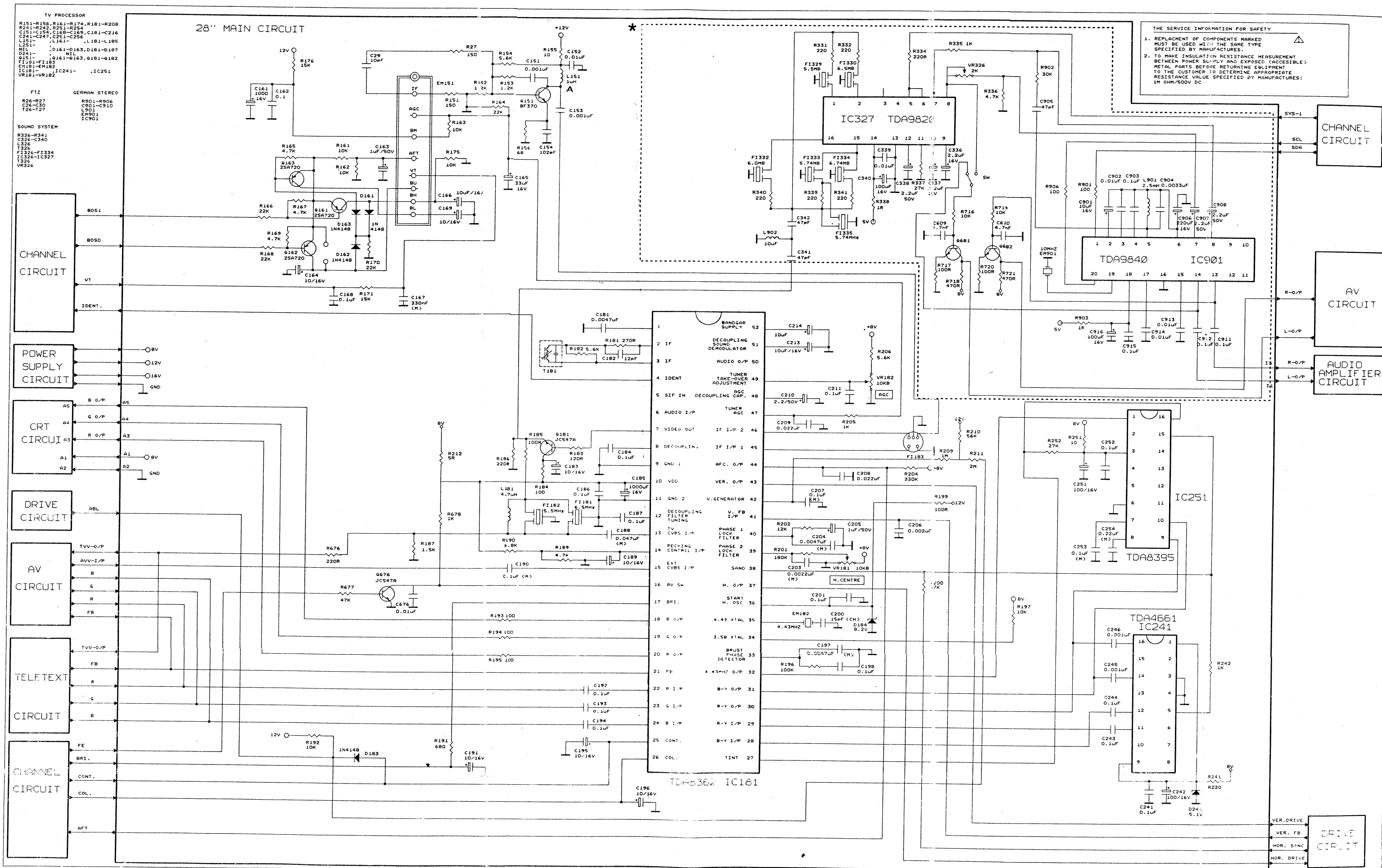




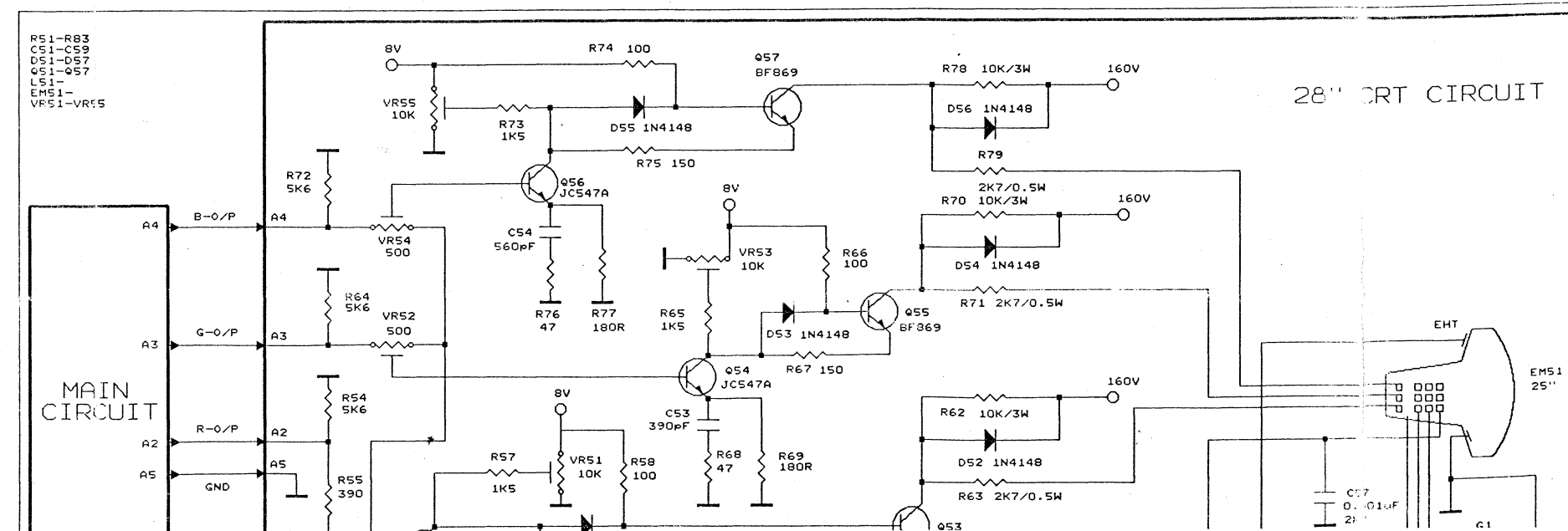
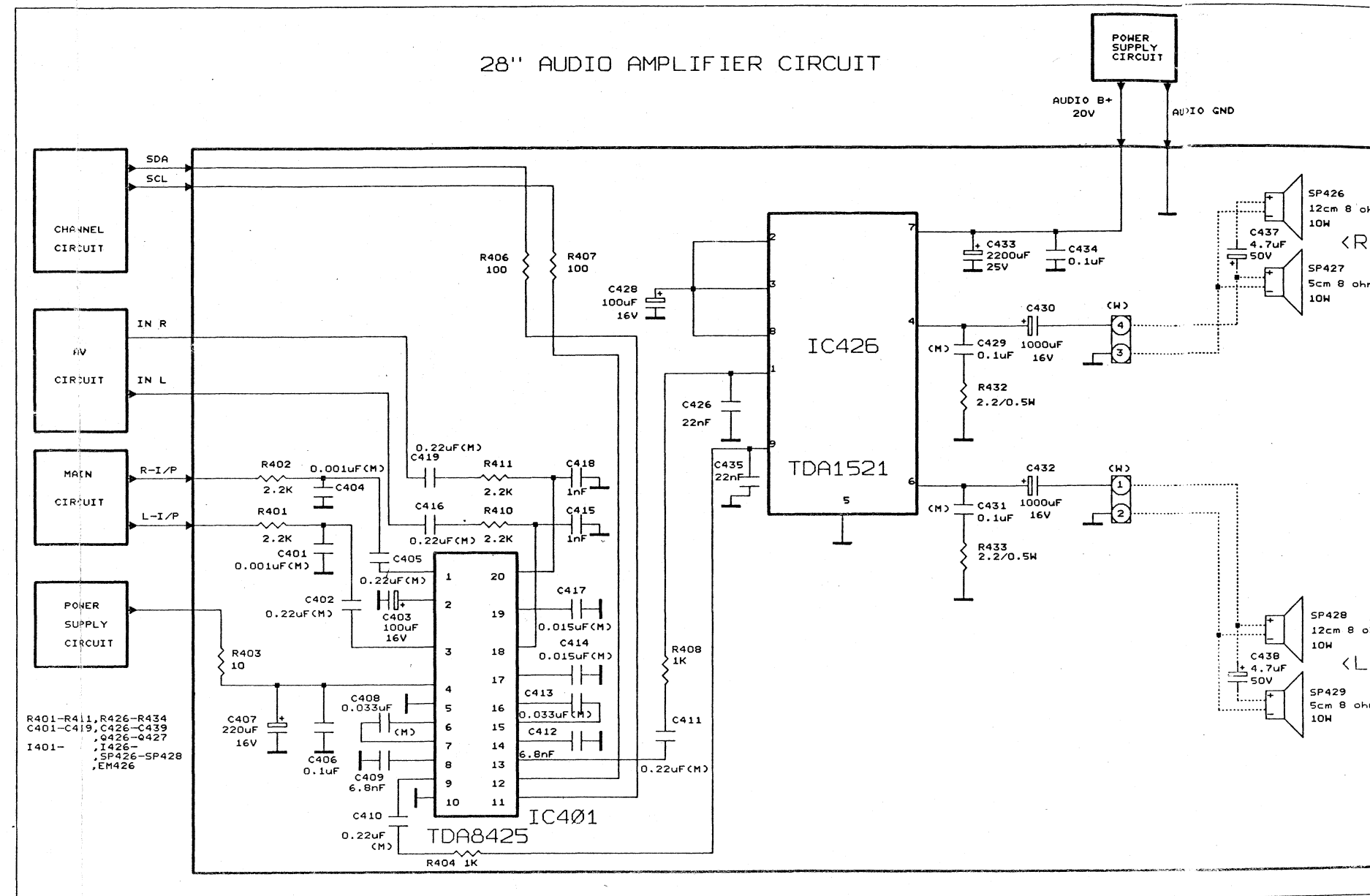
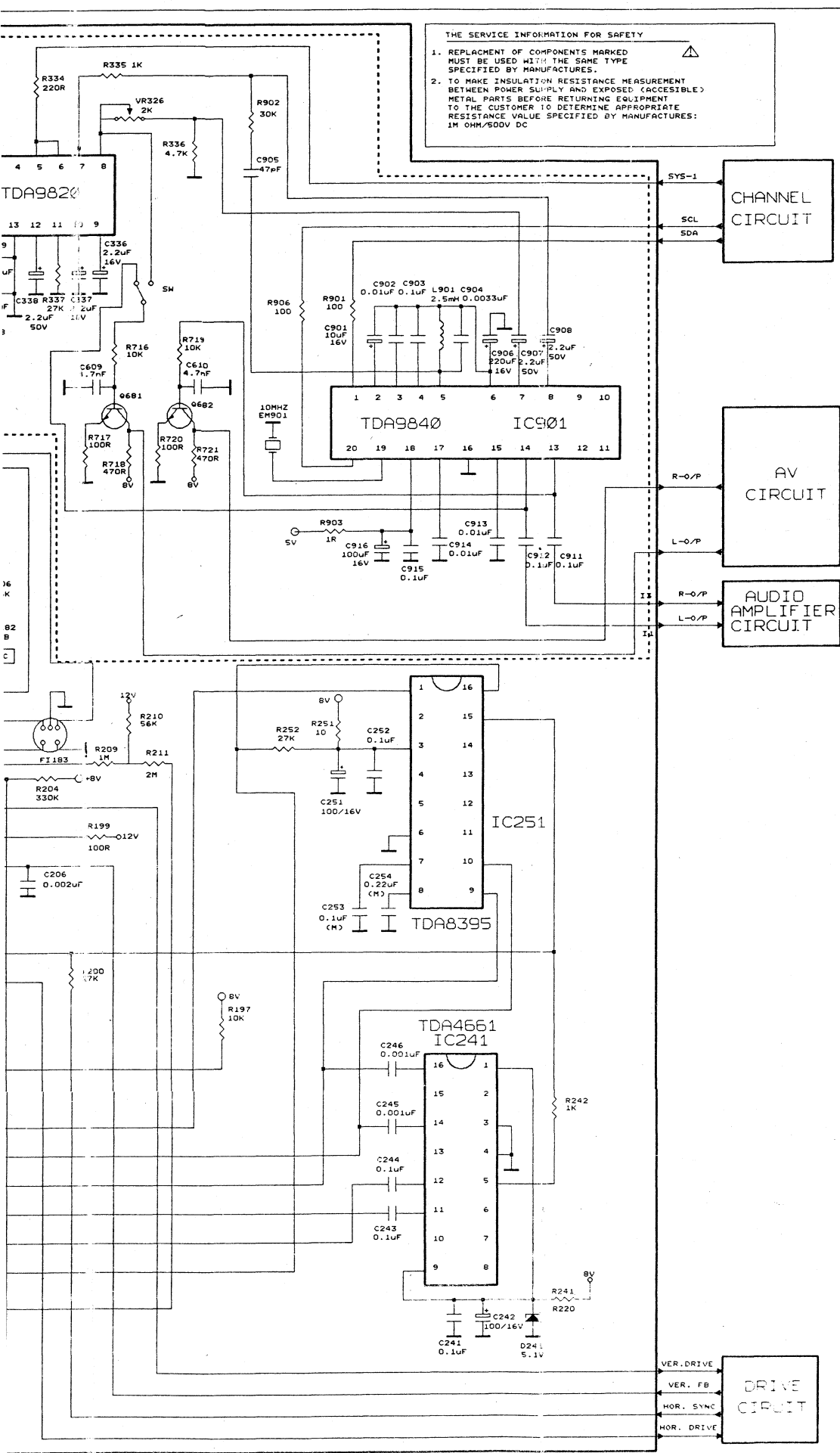
MAIN PCB



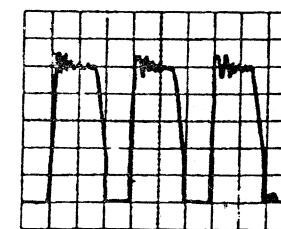
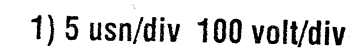
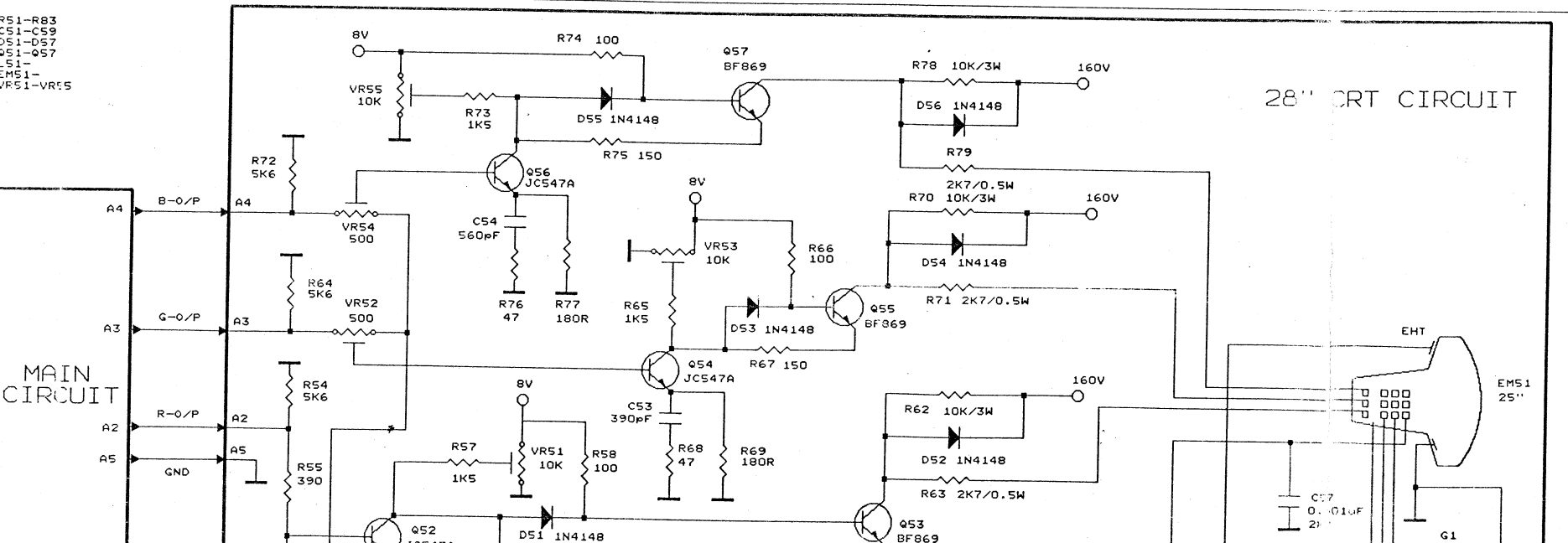
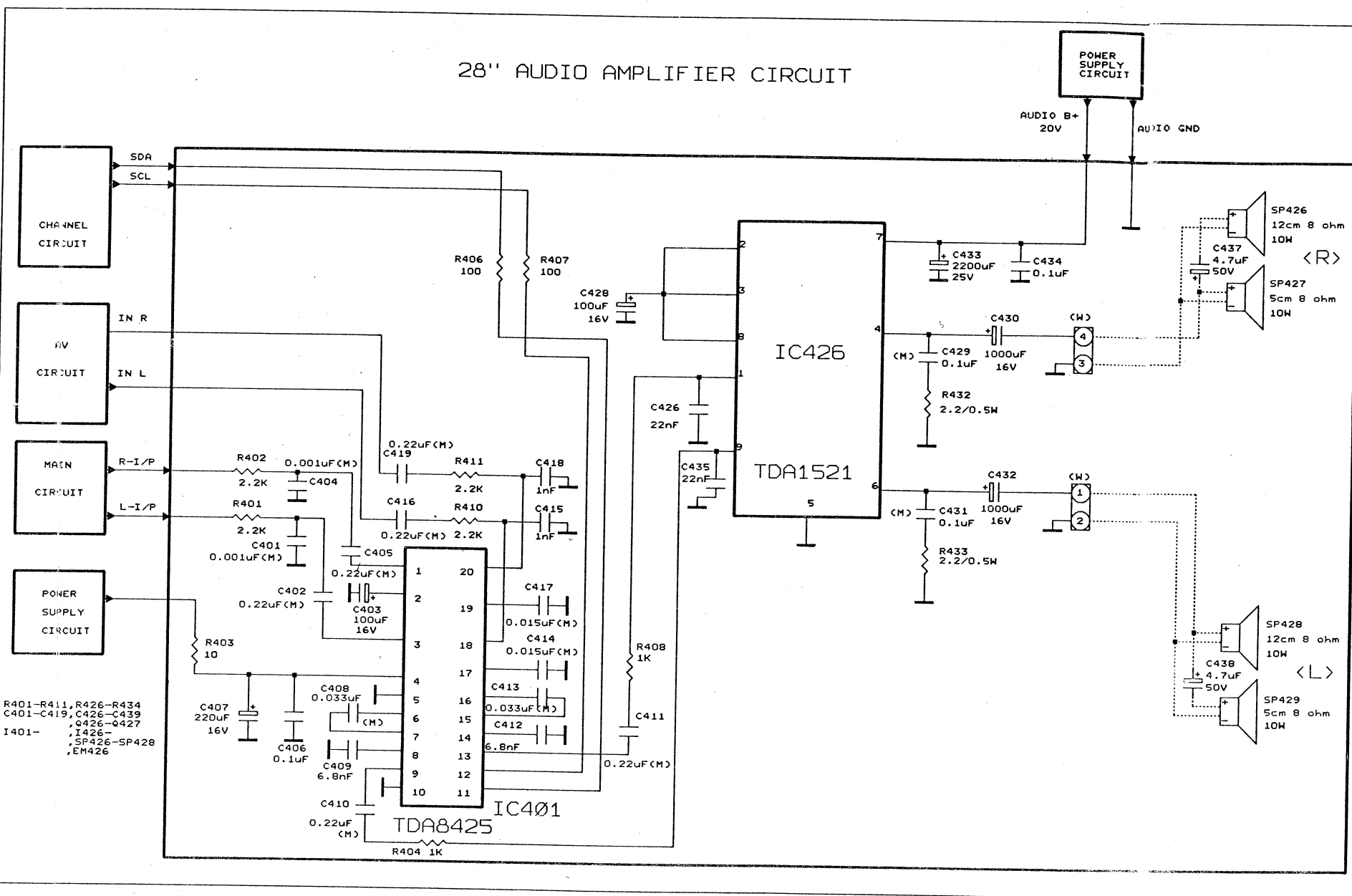
28" SM-1 STEREO



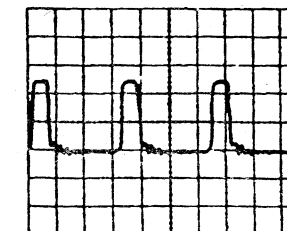
28" SM-1 STEREO CIRCUIT DIAGRAM



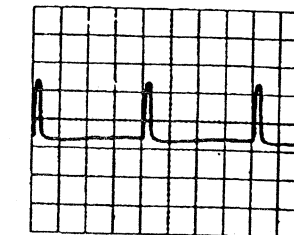
CIRCUIT DIAGRAM



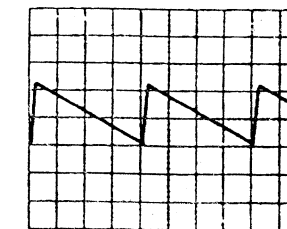
Collector of Q101



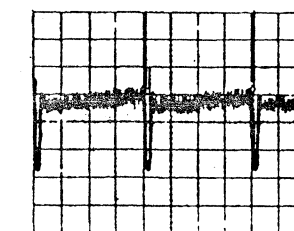
IC-476 pin 26



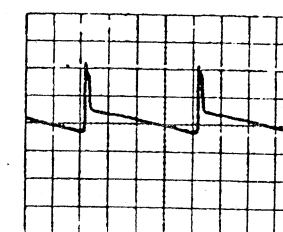
IC-476 pin 27



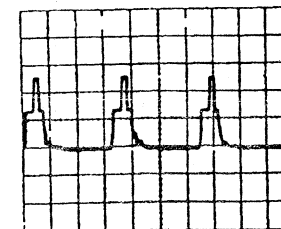
IC-181 pin 41



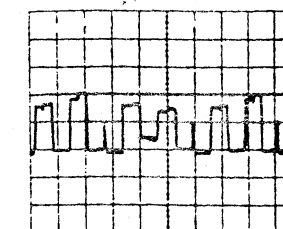
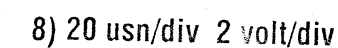
IC-576 pin 5



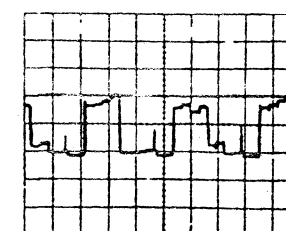
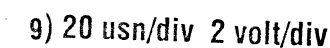
IC-576 pin 3



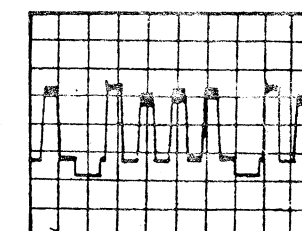
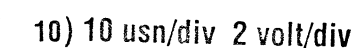
IC-181 pin 38



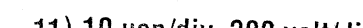
IC-181 pin 20

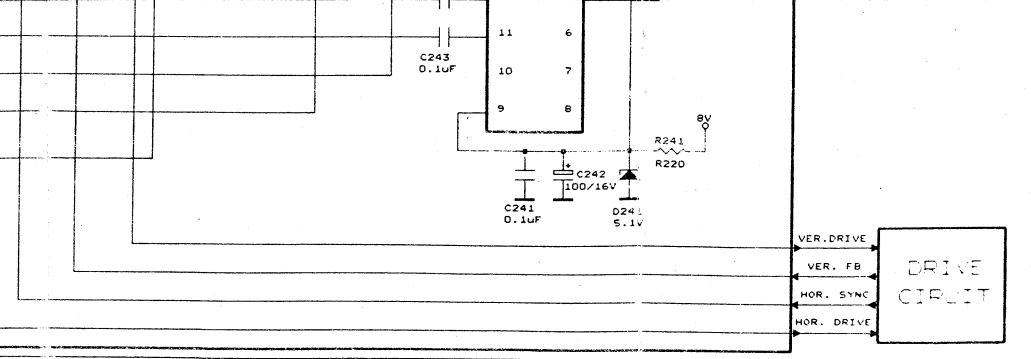


IC-181 pin 19



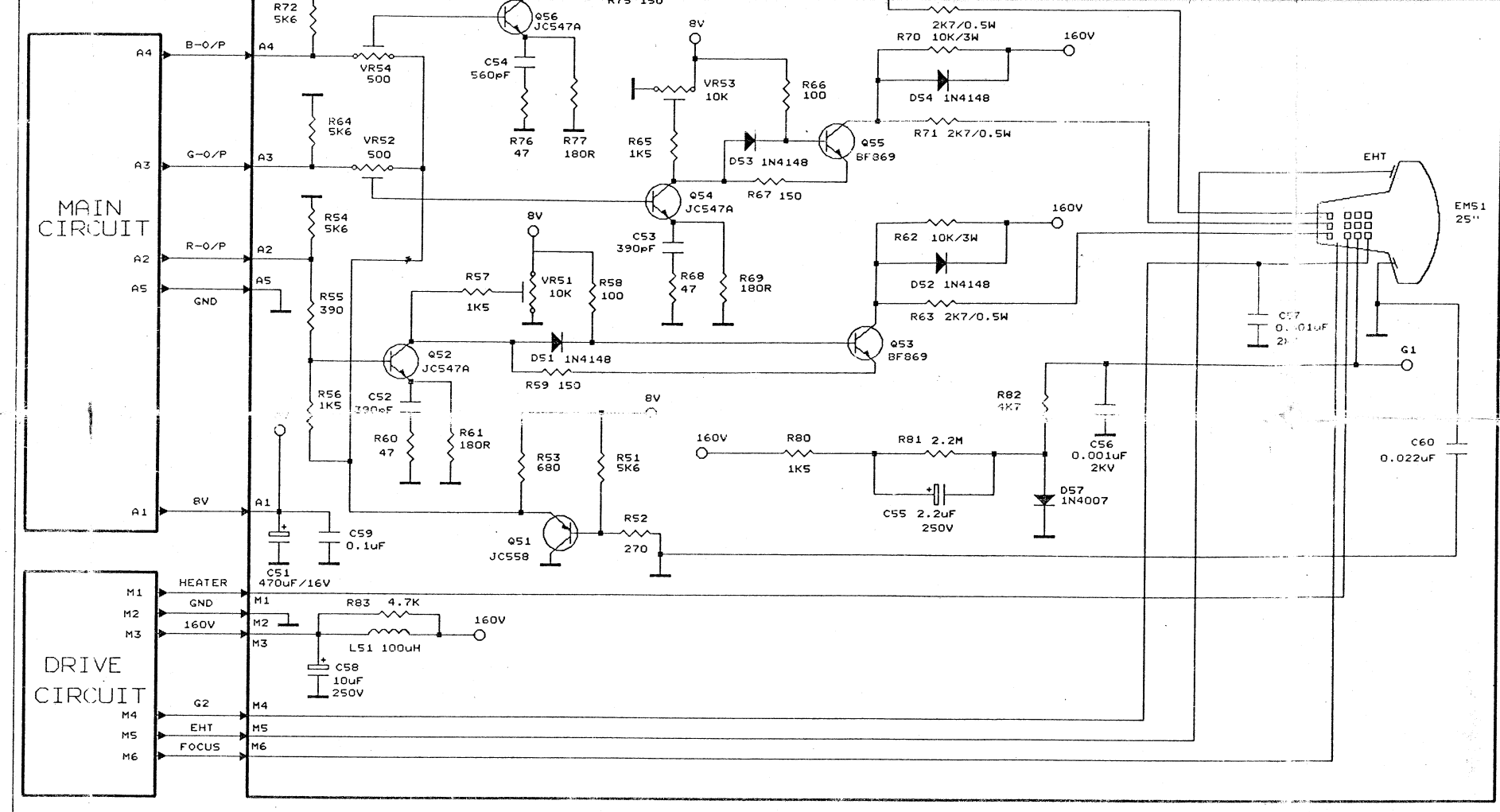
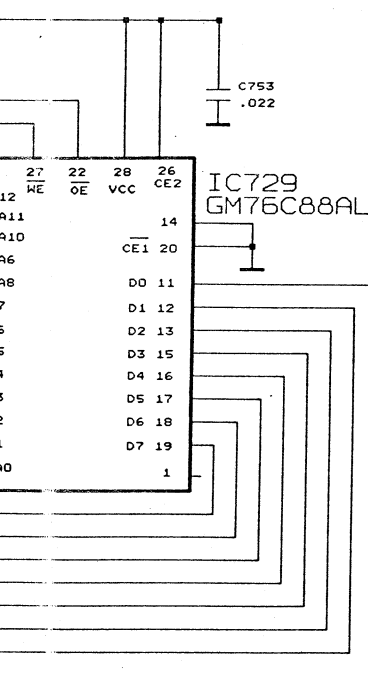
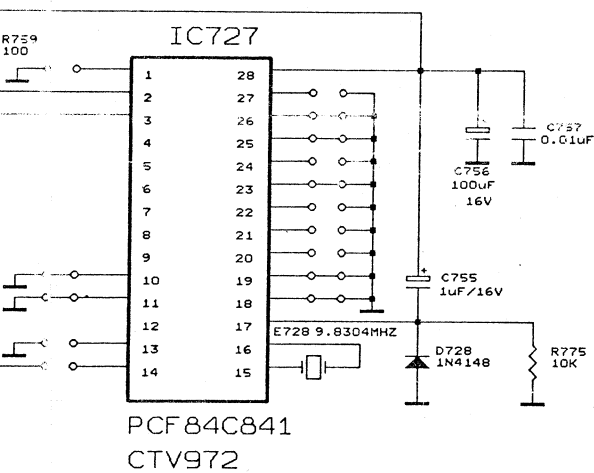
IC-181 pin 18





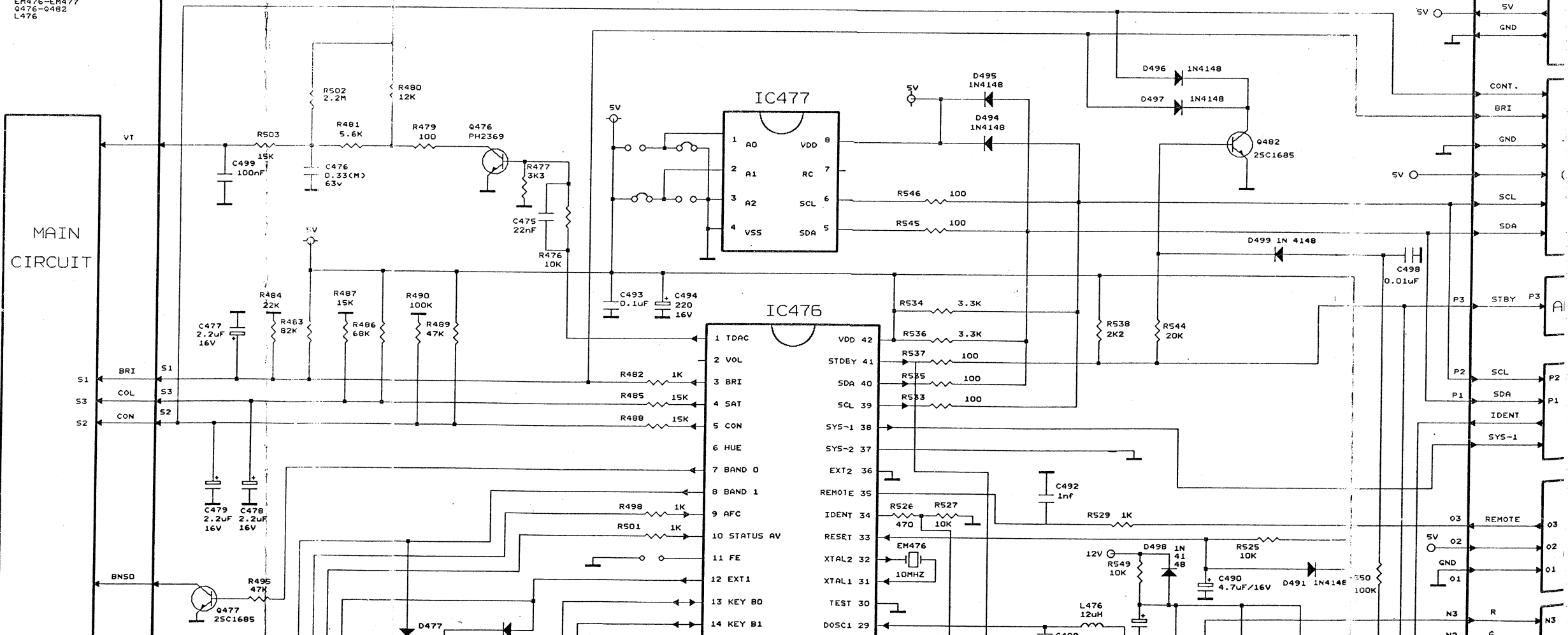
REL,
SCHEMATICS

TELETEXT CIRCUIT



SW476-SW486
R476-R554
C476-C500
D476-D499
EM476-EM477
Q476-Q482
L476

28" CHANNEL CIRCUIT



~~IF FOOT 1V SET IS NICAM STEREO INSTEAD OF GERMAN STEREO,~~
THIS AREA MUST BE CHANGED WITH NICAM 1 AND NICAM 2 SCHEMATICS

